John Milhau

PROCEEDINGS

OF THE

AMERICAN PHARMACEUTICAL ASSOCIATION

AT THE

Twenty-fourth Annual Meeting,

HELD IN PHILADELPHIA, PA., SEPTEMBER, 1876.

ALSO THE

CONSTITUTION, BY-LAWS, AND ROLL OF MEMBERS.

PHILADELPHIA:
SHERMAN & CO., PRINTERS.
1877.

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1876-77.

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REPORTER ON PROGRESS OF PHARMACY.

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PROPOSED AMENDMENT TO THE BY-LAWS.

To be acted on at the Twenty-fifth Annual Meeting.

Add to Chapter VII, Article 10, the following:

A motion to expel a member shall be laid over to the session next succeeding that at which the motion is made.

Proposed by Mr. Charles L. Eberle at the fifth session of the Twenty-fourth Meeting.

LIST OF QUERIES

TO BE ANSWERED AT THE TWENTY-FIFTH ANNUAL MEETING, IN 1877, AT TORONTO, ONTARIO, CANADA.

QUERY 1. The preservative properties of Boracic, Benzoic, and Salicylic Acids have lately attracted considerable attention. What are their respective values as preservatives, and which is best adapted to the uses of the pharmacist? If possible, give a ready method for their use.

Accepted by S. P. Sharples, Boston.

2. Veratrum Viride. As several different conclusions have been reached by late investigators in regard to the active principles of this drug, an accurate analysis is desired in order to definitely settle the subject.

Accepted by C. A. Robbins, New York.

3. The present officinal formula for the preparation of Fluid Extract of Ipecacuanha is both complicated and impracticable in its details, and unsatisfactory in its product. Should the formula of the Pharmacopœia of 1860 be retained in the next revision, or can a more perfect mode of preparation be devised?

Accepted by J. Faris Moore, Baltimore.

4. A more perfect formula for the preparation of Fluid Extract of Wild Cherry is desired, representing both the astringent and sedative properties of the drug.

Accepted by E. S. Wayne, Cincinnati.

5. The present officinal formula for the preparation of Confection of Senna directs the use of Cassia fistula, a drug not always easily obtained, and consequently has caused the substitution of other and less active drugs. Cannot this formula be modified, or the Cassia fistula substituted by some drug more generally in use?

Accepted by Adolph W. Miller, Philadelphia.

6. What are the comparative values of Benzoin and Styrax for preserving ointments, etc., from rancidity and decomposition?

Accepted by I. J. Grahame, Philadelphia.

7. Much difficulty has been experienced of late years in procuring an article of litharge for the manufacture of Lead Plaster which will yield a per-

fectly white plaster. To what is this variation owing, and what is the most ready method of determining a satisfactory article of litharge?

Accepted by E. S. Wayne, Cincinnati.

8. Which is the best menstruum for the preparation of Tincture and Extract of Arnica, Alcoholic or Hydro-alcoholic?

Accepted by M. L. M. Peixotto, New York.

9. The quantity of Acetic Acid in the formula for the preparation of Acetic Extract of Colchicum (U. S. P., 1870), is directed to be four fluid ounces for twelve troy ounces of drug. Is not this quantity unnecessarily large, and cannot less be used without interfering with the stability of the preparation? Also, can the formula be altered in regard to its menstruum by using alcohol with any advantage?

Accepted by I. J. Grahame, Philadelphia.

10. The present formula for Cantharidal Collodion contains but a very small quantity of alcohol, rendering the pyroxylon very difficult of solution. Cannot the quantity of alcohol be increased with advantage without materially interfering with the character of the film?

Accepted by Joseph Roberts, Baltimore.

11. Nearly all the Lactic Acid in use in this country is manufactured abroad. Cannot this acid be made as well and as cheaply in this country? Give a formula for its preparation.

Accepted by S. P. Sharples, Boston.

12. It has been asserted that nearly all the white wax now found in the market is adulterated with paraffin, Japan wax, and stearin. Is this so, and how can the adulterants be accurately detected?

Accepted by P. W. Bedford, New York.

13. In view of the coming revision of the Pharmacopœia, a review of the present class of officinal fluid extracts is desired, in order that their defects may be remedied and more satisfactory formulas adopted. Also, more information regarding the standard of commercial fluid extracts, with their sophistications and general state of purity.

Accepted by Charles L. Mitchell, Philadelphia.

14. When a syrup of Pyrophosphate of Iron is prepared by dissolving pyrophosphate of iron in simple syrup, after some time the preparation becomes much darker, and finally deposits a white scale. What is the cause of this? Is it a decomposition, and can it be remedied?

Accepted by J. F. Judge, Cincinnati.

15. The oleates of mercury, morphia, etc., have of late years been introduced into medical practice with considerable success. Give a standard set of formulas for their preparation, together with, if possible, a convenient and comparatively simple process for preparing pure oleic acid.

Accepted by W. S. Thompson, Baltimore.

16. Is there any difference in the quantity or quality of aqueous extract of aloes, when prepared with boiling or with cold water?

Accepted by George W. Kennedy, Pottsville, Pa.

17. What is the amount of alkali in the commercial calcined and carbonate of magnesia?

Accepted by George Leis, Lawrence, Kansas.

18. An essay on the use of citric acid and other preservative agents in syrup of iodide of iron.

Accepted by P. W. Bedford, New York.

19. What is the nature of the free acid contained in fluid extract of taraxacum, and is it augmented in quantity by age and exposure, and does a similar change take place in the root collected in accordance with the Pharmacopœia and kept with or without special precautions?

Accepted by H. A. Vogelbach, Philadelphia.

20. Several salts having been recommended to increase the solubility of salicylic acid in water, it is desirable to ascertain whether any chemical change is produced thereby; an essay on the subject, with the investigation into the nature of such changes.

Accepted by David Hays, New York.

21. In making resina podophylli (U. S. P.) the concentrated tincture is precipitated by acidulated water, for which some manufacturers substitute an aqueous solution of alum. What effect has the substitution of alum and other acid salts upon the physical and chemical properties of the product, and what is the medicinal value of the principles remaining dissolved in the aqueous solution?

Accepted by B. F. McIntyre, New York.

22. A root having recently appeared in the market which resembles and is sold as senega, it is queried what is the origin of this root, and does it contain any polygalic acid?

Accepted by John M. Maisch, Philadelphia.

23. Give working formulas for the various pharmaceutical preparations of cod-liver oil in use in the United States, and of such as may appear desirable from other countries.

Accepted by J. Williams, Worcester, Mass.

24. Do certain medicinal plants lose their medicinal properties upon drying, and will it be better to tincture them while fresh?

Accepted by J U. Lloyd, Cincinnati.

25. Stylophorum diphyllum, Nutt., which grows abundantly in the Western States, is closely allied to Chelidonium majus. A chemical analysis is requested, with a view to comparing its composition with that of chelidonium.

Accepted by O. Eberbach, Ann Arbor.

26. Spirit of Nitrous Ether. Determine, if possible, a method by which the product of the United States Pharmacopœia can be tested, so as to obtain a finished spirit containing uniformly five per cent. of nitrous ether.

Accepted by J. Creuse, New York.

27. Ergotin by Bonjean's method. Determine the yield when using alco-

hol of different strengths for the extraction of the aqueous extract, and give a working formula to secure a uniform result.

Accepted by Henry S. Wellcome, New York.

28. Guarana. Determine the best method for its extraction, so as to secure all the guaranin with the least possible quantity or percentage strength of alcohol, and determine a rapid and pharmaceutically accurate method for the assay of the alkaloid in its various preparations and in the powder.

Accepted by S. W. Cochran, Camden, N. J.

29. Grindelia robusta. Determine the best methods for making the various galenical preparations.

Accepted by Charles L. Mitchell, Philadelphia.

30. Lactucarium. Is it desirable that a concentrated liquid preparation should be prepared, from which might be made the syrup, or tincture, or other preparations occasionally called for?

Accepted by Joseph L. Lemberger, Lebanon, Penna.

31. Extract of Licorice. How can this be most economically prepared of such a character that, while definite in its composition, it shall be readily and completely soluble in water?

Accepted by M. L. M. Peixotto, New York.

32. Glycerin is extensively employed in the manufacture of officinal and unofficinal fluid extracts. What articles are proven, by actual experience in the laboratory, to be improved by the addition of glycerin, and in what manner does the beneficial power of glycerin in such extracts exhibit itself?

Accepted by J. U. Lloyd, Cincinnati.

33. When spiritus ætheris nitrosi is mixed with fluid extract of uva ursi it is stated that in some cases a certain decomposition ensues, while in others no change is noted. What is the cause of the reaction?

Accepted by J. L. A. Creuse, New York.

34. What is the character of the Peruvian barks supplied to the public by the retail druggists of America?

Accepted by L. M. Royce, New York.

35. An examination into the methods of distinguishing the alkaloids of cinchona bark from each other.

Accepted by S. P. Sharples, Boston.

36. A report on microscopes suitable for the pharmacist, quality and price being referred to.

Accepted by G. F. H. Markoe, Boston.

37. What other alkaloids, if any, are similar to or identical with atropia?

Accepted by H. D. Garrison, Chicago.

38. Is it desirable and practicable to introduce in the revision of the Pharmacopœia an assay morphia strength for tincture of opium in place of the present formula yielding a product of indefinite morphia strength?

Accepted by Adolph Pfeiffer, St. Louis.

39. Eriodictyon Californicum is receiving attention for its action in lung diseases and bronchial affections. What is its therapeutical value, and to what is its activity due? Make a chemical examination of it.

Accepted by G. F. H. Markoe, Boston.

40. What is the relative therapeutic value of aloin as compared with aloes? Can the former be used as an efficient substitute for the latter?

Accepted by A. P. Brown, Camden, N. J.

41. What knowledge of therapeutics should the properly educated pharmacist possess?

Continued to Benjamin T. Fairchild, New York.

42. A treatise on Salicylic Acid, its solubilities and pharmaceutical uses.

Continued to R. V. Mattison, Philadelphia.

43. According to Z. Roussin, the sweet taste of licorice root is due to an ammoniacal compound of glycyrrhizin (see Am. Jour. Pharm., 1875, Sept.). Query: Can the fluid extract of licorice root U. S. P. be mixed with solutions of alkaloids, so as to mask their taste without precipitating them?

Continued to William McIntyre, Philadelphia.

44. How are compressed pills prepared, and what advantages, if any, do they possess?

Continued to John Henry Hancock, Philadelphia.

45. What advantages would result from the substitution of parts by weight for absolute quantities in the revision of the Pharmacopœia, and if any disadvantages other than those incident to change, what are they?

Continued to S. P. Sharples, Boston.

46. How does the quality of spirit of nitrous ether of the market compare with the requirements of the U. S. P.? On keeping in half-filled bottles, it becomes acid; is this due to aldehyd, and is the latter of therapeutic value in the preparation? If not, can it be removed economically, and would its removal render the preparation more permanent?

Continued to P. W. Bedford, New York.

47. Are the sugar-coated Quinia Pills vended in our markets always what they purport to be? A paper giving the results of an examination of the various makes.

Continued to David Hays, New York.

48. The French filtering-paper that is imported at the present time contains an appreciable amount of soluble and a large amount of coloring matter. What substitute can be used, or what can be done to cause an improvement in its quality?

Continued to James S. Talbot, Boston.

49. Can any of the decoctions or infusions of the U. S. P. be satisfactorily prepared from the fluid extracts of the U. S. P., and in what particulars do they differ from infusions and decoctions prepared in the prescribed manner?

Continued to John Henry Hancock, Philadelphia.

50. What chemicals may be profitably made by the retail pharmacist, and what apparatus is required for their preparation?

Continued to James R. Mercein, Jersey City.

51. What is the nature of the union in the combination of equal parts of chloral hydrate and camphor?

Continued to Joseph Roberts, Baltimore.

52. The fixed oils of benne and poppy seed are not protected from oxidation, according to Cloëz, by keeping them in colored bottles (Journal de Pharmacie et de Chimie, 4 Ser., ii, 345; Am. Jour. Pharm., 1866, p. 86). Query: How are non-drying oils, such as olive, almond, and lard oil, affected when kept under similar circumstances, and what effect has the summer and winter temperature upon the results?

Continued to Thomas E. O. Marvin, Portsmouth, N. H.

53. An essay on the bromine production of the United States.

Continued to Henry S. Welleome, New York.

54. The resin of Leptandra Virginica (the leptandrin of commerce) varies much in appearance and sensible properties. To what causes are these varying results to be attributed? What is the best process for the preparation of the resin, and what is the average yield from the root?

Continued to H. G. Keasby, Philadelphia.

55. How far are the so-called resinoids of commerce prepared according to the prescribed formulas, and can better processes be devised for the preparation of some of the more important of them?

Continued to W. J. M. Gordon, Cincinnati.

56. In preparing emulsions of almonds and other seeds considerable force is required to reduce the seeds to a uniformly smooth mass, in order to insure their exhaustion with water. Query: What is the best shape and material for mortars adapted to this purpose?

Continued to E. Gregory, Lindsay, Ontario.

57. The root of Epilobium angustifolium is said to have been used with success in the treatment of aphthæ. Is this opinion well founded, and if so, to what principle in the root is its remedial action to be attributed?

Continued to C. J. Biddle, Philadelphia.

58. An essay on Gelsemium sempervirens, embracing the question as to what principle its activity is due, and whether the green root possesses any advantage over the dry?

Continued to W. H. Jones, Boston.

59. Can the formula for Scammony Resin (U. S. P.) be improved, and what is the objection, if any, to the exhaustion of scammony by alcohol at ordinary temperatures and simple evaporation of the tincture.

Continued to G. F. H. Markoe, Boston.

60. How may concentrated preparations from aromatic drugs be best prepared, so that the preparation shall be permanent, and represent all the active constituents of the drug?

Continued to G. F. H. Markoe, Boston.

61. An essay suggestive and critical on the best plan of arranging and managing the store-rooms and cellar of a well-conducted dispensing store.

Continued to J. F. Hancock, Baltimore.

CONTENTS.

REPORT ON THE PROGRESS OF PHARMACY.

REPORTS OF COMMITTEES.

SPECIAL AND VOLUNTEER REPORTS AND ESSAYS.

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II. Materia Medica:

III. Chemistry:

MINUTES OF THE TWENTY-FOURTH ANNUAL MEETING.

PAGE

PREFATORY NOTICE.

In presenting this volume to the members of the American Pharmaceutical Association, the undersigned express the hope that the change adopted in the typography of the work will meet with the hearty approval of all members. The smaller type, which is now used for the first time (a portion of the volume for 1859 excepted), was considered necessary with the view of keeping the size of the volume within convenient limits, and leaves nothing to desire for clearness, while the saving of space amounts to several hundred pages; so that in the amount of matter contained in it, the present is the largest volume ever published by the Association, and we hope will be found equal in interest and usefulness to those preceding it.

The portrait of John Milhau, which embellishes this volume, is an excellent likeness of a man, who though never prominent as a writer or speaker, has always been foremost in the ranks of those laboring for the advancement of pharmacy; he was one of those who, in the New York College of Pharmacy, matured the project of the Convention of 1851, and who in 1852 assisted in founding this Association. As an officer of both the New York College and this Association, he has done good and efficient service. A brief obituary notice will be found in the Proceedings for 1875, page 764.

Attention is likewise directed to the very correct and well-executed lithographic plate, which accompanies Mr. Saunders's paper on Cantharides (page 505), and for the execution of which we are indebted to that gentleman's liberality. The plates opposite pages 130 and 134, on Rheum officinale and Eriodyction Californicum, have been prepared, the former after a lithograph accompanying Prof. Flückiger's paper on Rhubarb, in Buchner's Neues Repertorium; the latter by our fellow-member, H. S. Wellcome.

We again direct the attention of the members to the following, to which we have repeatedly alluded on former occasions:

1. That all applications for membership be sent in, if possible, a week in advance of the annual meeting.

2. That in addition to the necessary signatures, each application be supplied with the *full name* of the applicant, either printed or plainly written at the head of the application.

3. That the application be accompanied by the requisite funds, if the applicant is not likely to be present at the annual meeting.

4 That all papers and reports, presented at the meetings, be finished ready for the printer.

5. That authors of papers hand to the Secretary a list of preparations exhibited in connection therewith, and a sketch of the illustrations that may be desirable.

6. That all inaccuracies in the roll or changes in address be communicated to the Secretary; and

7. That the undersigned chairman be notified at the earliest opportunity of the demise of members.

The attention of the members is likewise directed to the badge of the Association (see page 583), which, nickel-plated, will be mailed by the Secretary on receipt of fifty cents; and to the Proceedings for 1854, which have recently turned up.

The prices of the Proceedings, now on hand, *including postage*, have been fixed as follows:

1851, 1852, 1853, 1854, 1855,	unbound,	$0 25	each.		
1857,	"	0 50		bound,	$0 80
1858, 1859,	"	1 50	"	"	1 75
1860,				"	1 25
1862, 1863,				"	1 50
1864, 1865, 1866,	"	1 50	"	"	1 80
1867,	"	2 20	"	"	2 50
1868, 1869, 1870,	"	2 50	"	"	3 00
1871,	"	4 50	"	"	5 00
1872,	"	2 50	"	"	3 00
1873, 1874,	"	5 00	"	"	5 50
1875, 1876,	"	7 00	"	"	7 50

The entire set of bound volumes, the first six in paper covers, will be furnished at $48; the set of unbound volumes, including the bound ones for 1860, 1862, 1863, are held at $42. The prices for entire sets are *exclusive of postage or express charges.*

The Twenty-fifth Annual Meeting will be held in the city of Toronto, Ontario, Canada, on the first Tuesday (fourth day) of September, 1877, at three o'clock P.M.

To facilitate and expedite the business at and after the Annual Meetings, the Executive Committee have deemed it expedient to print a form of credentials, which the various Associations sending delegates are requested hereafter to use. Copies may be obtained from the Permanent Secretary.

In addition to the delegates on page 698, Charles P. Rendigs and Henry Wagner, Cincinnati, have likewise signed the constitution.

GEORGE W. KENNEDY,
Chairman of the Executive Committee, Pottsville, Pa.

JOHN M. MAISCH,
Permanent Secretary, 145 North Tenth Street, Philadelphia.

December 7th, 1876.

List of Members, Delegates, and Guests

PRESENT AT THE TWENTY-FOURTH ANNUAL MEETING.

Abel, Joseph, Pittsburg, Pa.
Aimar, G. W., Charleston, S. C.
Albrecht, E., Tamaqua, Pa.
Alsdorf, J., New York.
Ambler, S. H., New York.
Anderson, S., Bath, Me.
Angney, J. R., Philadelphia.
Armstrong, A. M., Akron, O.
Armstrong, James A., Camden, N. J.
Arnold, J. K., Boston, Mass.
Appleton, G. J., Keene, N. H.
Ash, M. F., Jackson, Miss.
Atwood, L. L. Pittsfield, Mass.
Babcock, J. F., Boston, Mass.
Baldus, William T., Washington, D.C.
Balluff, P., New York.
Balser, G., New York.
Bauer, L. G , Philadelphia.
Bayley, A. R., Cambridgeport.
Bedford, P. W, New York.
Benjamin, D. B., Camden, N. J.
Berrian, G. W., Jr., North Andover, Mass.
Biddle, C. J., Philadelphia.
Bischof, A. S., New York.
Blair, A., Philadelphia.
Blair, H. C., Philadelphia.
Blake, J. E.. New Bedford, Mass.
Blattermann, G. W., Maysville, Ky.
Blunt, I. W., Richmond, Va.
Bocking, E., Wheeling, W. Va.
Booth, C. F., Brooklyn, N. Y.
Boring, E. M., Philadelphia.
Borland, M. W., Chicago, Ill.
Bossler, D. J., Germantown, Philada.
Boutelle, W. E., Providence, R. I.
Bower, Henry, Philadelphia.
Bower, H. A , Philadelphia.
Bowker, James, Philadelphia.
Boyden, A., Boston, Mass.
Boynton, H., Biddeford, Maine.
Brown, A. P., Camden, N. J.
Brown, W. H., Baltimore, Md.
Brown, J. J., Philadelphia.
Buehler, E. H., New York.
Bullock, Charles, Philadelphia.
Bunting, S S., Philadelphia.
Burgess, E., Norfolk, Va.
Calder, A. L., Providence, R. I.
Campbell, H. W., New York.
Campbell, Samuel, Philadelphia.
Candidus, P. C., Mobile, Ala.
Canning, H., Boston.
Carpenter, George W., Philadelphia.
Carter, S., Boston.
Cassebeer, H A., Jr., New York.
Childs, L. M., Tiffin, O.
Chipman, E. D., Frankford, Philada.
Cochran, S. W., Camden, N. J.
Colcord, S. M., Boston.
Coombe, Th. R., Philadelphia.
Cook, G. E , Port Jervis, N. Y.
Cook, J. G., Lewiston, Me.
Cornell, E. A., Williamsport, Pa.
Crawford, W. H., St. Louis, Mo.
Creuse, J., Brooklyn, N. Y.
Cressler, C. H., Chambersburg, Pa.
Cromwell, Z. W., Washington, D. C.
Cunningham, J. M., Pottstown, Pa.
Curtiss, C. G., Brooklyn, N. Y.
Dalrymple, C. H., Morristown, N. J.
Dame, S. P., Sharon, Pa.
Davidson, E. J., Philadelphia, Pa.
Davis, G. W., Providence, R. I.
De la Cour, I. S., Camden, N. J.
Dennin, C., Brooklyn, N. Y.
Diehl, C. L., Louisville, Ky.
Dikeman, N., Waterbury, Conn.
Dobbins, E. T., Philadelphia, Pa.
Dohme, L., Baltimore, Md.
Donnell, J. W., Richmond, Me.
Drew, John W., Washington, D. C.
Duckett, W. G., Washington, D. C.
Dufour, C. R., Washington, D. C.
Dung, A. C., New York.
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Eberbach, O., Ann Arbor, Mich.
Eberle, H., Watertown, Wis.

Eberle, C. L , Germantown, Phila.
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Eldridge, G. W., Philadelphia, Pa.
Ellis, E. T., Philadelphia, Pa.
Emich, C. V., Baltimore, Md.
England, R., Philadelphia, Pa.
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Fehr, J., Hoboken, N. J.
Ferris, C. E , Lawrenceburg, Ind.
Folger, W. S., Boston, Mass.
Foster, H B., Concord, N. H.
Fox, P. P., Philadelphia, Pa.
Frohwein, Max, New York.
Frohwein, Rich'd, Elizabethport, N. J.
Frohwein, Theodore, New York.
Frost, W. A , Newport, R. I.
Früh, Carl D. S., Philadelphia, Pa.
Fuller, H. W., Chicago, Ill.
Fuller, S H., Boston, Mass.
Gaillard, E. A., Philadelphia, Pa.
Garrison, H. D., Chicago, Ill.
Gates, A. O., Morrisville, Vt.
Gerhard, Samuel, Philadelphia, Pa.
Gilmore, J. W., New York.
Gordon, W. J. M., Cincinnati, O.
Grahame, Israel J., Philadelphia, Pa.
Greene, G E., Wyoming, R. I.
Grove, J. E., Philadelphia, Pa.
Hancock, C. W., Philadelphia, Pa.
Hancock, J. F., Baltimore, Md.
Hancock, J. H., Philadelphia, Pa.
Harwood, F. L., Warren, Mass.
Hassencamp, F., Baltimore, Md.
Haviland, H., New York.
Hawkins, M. S., Salem, O.
Hays, D., New York.
Heimstreet, E. B., Janesville, Wis.
Heinitsh, C. A., Lancaster, Pa.
Heintzelmann, J. A., Philada., Pa.
Hepburn, J., Flushing, L. I , N. Y.
Higgins, A. W., Rutland, Vt.
Hinsdale, S. J., Fayetteville, N. C.
Hoagland, P. R., Boston, Mass.
Hoffman, F., New York.
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Holzhauer, C , Newark, N. J.
Horton, W. F., Boston, Mass.
Hubbard, J. H., Cambridge, Mass.
Hunt, J. L., Hingham, Mass.
Hurst, John C., Philadelphia, Pa.
Hyler, W. H., Portchester, N. Y.
Ingalls, John, Macon, Ga.
Iwanaga, S., Tokio, Japan.
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Jefferson, C. L., Philadelphia, Pa.
Jenks, T. L., Boston, Mass.

Jenks, W. J., Philadelphia, Pa.
Jennings, N. H., Baltimore, Md.
Jenkins, L. L., Boston, Mass.
Jones, A. H., Philadelphia, Pa.
Jones, Daniel S., Philadelphia, Pa.
Jones, Edward C., Philadelphia, Pa.
Judge, J. F., Cincinnati, O.
Jungmann, J., New York
Kay, I. H , Philadelphia, Pa.
Keasbey, H. G., Philadelphia, Pa.
Keeney, C. R., Philadelphia, Pa.
Kennedy, G. W , Pottsville, Pa.
Keys, Roger, Philadelphia, Pa.
Kiersted, H. T , New York.
Kimmel, H., New York.
King, James T., Middletown, N. Y.
Kitchen, C. W., Brooklyn, N. Y.
Kline, M N., Philadelphia, Pa.
Koehnken, H. H., Cincinnati, O.
Kolp, C. H., Philadelphia, Pa.
Krewson, W. E., Philadelphia, Pa.
Krusemarck, C., Chicago, Ill.
Lane, A. S., Rochester, N. Y.
Latimer, R. F., Westerly, R. I.
Lawler, C. J., Brooklyn, N. Y.
Lee, E. H., Camden, N. J.
Leis, G., Lawrence, Kan.
Lemberger, Joseph L., Lebanon, Pa.
Levering, P. W , Jersey City, N. J.
Lewis, B. C., Richmond, Va.
Lillard, Benjamin, Boston, Mass.
Lincoln, H. W., Hingham, Mass.
Livingston, W. B , Brooklyn, N. Y.
Loomis, John C., Jeffersonville, Ind.
Luckenbach, E. H., Bethlehem, Pa.
Ludlow, Charles, Springfield, O.
Luhn, G. J., Charleston, S. C.
Lumsden, C. H., Lynchburg, Va.
Macmahan, T. J., New York.
MacLean, F. P., San Francisco, Cal.
Main, T. F., New York.
Maisch, John M., Philadelphia, Pa.
Mangold, G. A., Trenton, N. J.
Markoe, George F. H., Boston, Mass.
Marvin, Thomas E. O., Portsmouth, N. H.
Masi, Fred. H., Norfolk, Va.
Mattern, W. K., Philadelphia, Pa.
Mattison, Richard V., Philadelphia.
McElhenie, Thomas D., Brooklyn, N. Y.
McInall, Edward, Jr., Wilmington, Del.
McIntyre, Byron F., New York.
McIntyre, E., New York.
McIntyre, W., Philadelphia, Pa.
Meincken, Henry, Cincinnati, O.
Menninger, H. J., Brooklyn, N. Y.
Meyers, E. T., Bethlehem, Pa.
Meyers, J. A., Columbia, Pa.

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Miller, G. Y., Luzerne, N. Y.
Miller, Polk, Richmond, Va.
Miller, J. A., Harrisburg, Pa.
Milligan, Decatur, Philadelphia.
Mingay, James, Saratoga Springs, N. Y.
Mitchell, Charles L., Philadelphia.
Miyake, H., Tokio, Japan.
Mohr, Charles, Mobile, Ala.
Moise, B. F., Charleston, S. C.
Moll, William, Saginaw, Mich.
Molwitz, Ernest, New York.
Moody, Richard H., Belfast, Me.
Moore, J. B., Philadelphia.
Moore, J. F. Baltimore, Md.
Morgan, R E., Barrington, Mass.
Morley, W. J., Austin, Texas.
Morrison, Thomas O, New York.
Morse, F. A., West Rutland, Vt.
Nagayo, S., Tokio. Japan.
Neergaard, William, New York.
Newbold, Thomas M., Philadelphia.
Nicol, Louis E, Brooklyn, N. Y.
Norwood, Theodore F, Cincinnati, O.
Oatman, Le Roy S., Angola, N. Y.
Orne, Joel S., Cambridgeport, Mass.
Painter, E., San Francisco, Cal.
Parcher, George A., Ellsworth, Me.
Parker, George H., Andover, Mass.
Parrish, Clemmons, Philadelphia.
Partridge, Charles K., Augusta, Me.
Patterson, J L., Philadelphia, Pa.
Patton, W. A., Catlettsburgh, Ind.
Peixotto, M. L. M., New York.
Penrose, S. F., Quakertown, Pa.
Perry, B. T., Manchester, N. H.
Pfeiffer, Adolph, St. Louis, Mo.
Pfingst, E. C., Louisville. Ky.
Pfingsten, G., New York.
Phelps, D., West Winstead, Conn.
Pile, W. H., Philadelphia.
Plaisted, J. H., Waterville, Me.
Plummer, G. B., Hinsdale, Mass.
Post, E., Athens, N. Y.
Preston, David, Philadelphia.
Price, C H., Salem, Mass.
Price, C. S, Washington, D. C.
Procter, W., Philadelphia.
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Ramsperger, G., New York.
Reinold, B. H., New York.
Remington, Joseph P., Philadelphia.
Rendigs, C. P., Cincinnati, O.
Reynolds, H. P., Plainfield, N. J.
Reynolds, W. K., Providence, R. I.
Rice, Charles. New York.
Rickey, R., Trenton, N. J.
Ricksecker, Theodore, New York.
Rittenhouse, H. N., Philadelphia.
Robbins, A., Philadelphia.
Robbins, C. A., New York.
Robbins, D. C., New York.
Roberts, Joseph, Baltimore, Md.
Roche, E. M, Philadelphia.
Roche, W. F, Philadelphia.
Rogers, W. H., Middletown, N. Y.
Rosengarten, M G., Philadelphia.
Royce, L. M., New York.
Runyon, E. W., New York.
Russell, E. L., Nashua, N. C.
Russell, E. W., Baltimore, Md.
Rust, W., New Brunswick, N J.
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Sander, Enno, St. Louis, Mo.
Sargent, E. H.. Chicago, Ill.
Saunders, William, London, Canada.
Scala, W. F., Washington, D. C.
Schafer, George H. Fort Madison, Ia.
Scheffer, E, Louisville, Ky.
Schroeder, H., Quincy, Ill.
Schwab, Lewis, Cincinnati, O.
Scofield, James S., New York.
Scott, W. H., Richmond, Va.
Seabury, G. J., New York.
Sevin, N. D., Norwich, Conn.
Sharp. A. P., Baltimore, Md.
Sharples, S. P., Boston, Mass.
Shaw, R. J., Plainfield, N. J.
Sherwood, H. S., Poughkeepsie, N.Y.
Shinn, James T., Philadelphia, Pa.
Shoemaker, Joseph L., Philada., Pa.
Shoemaker, R. M., Philadelphia, Pa.
Shryer, Thomas N., Cumberland, Md.
Shryock, Allen, Philadelphia, Pa.
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Smith, Ch. B., Newark, N. J.
Smith, Daniel B, Philadelphia, Pa.
Smith, T. C., Charlotte, N. C.
Snow, C. W., Syracuse, N. Y.
Sommers, R. M., Camden, N J.
Squibb, E. R., Brooklyn, N. Y.
Stanford, William H., Newark, N. J.
Starr, Thomas, New York.
Stein, J. H., Reading, Pa.
Stephens, W. E., New York.
Taliaferro, E. C., Richmond, Va.
Tarrant, H. P., Augusta, Ga.
Tartiss, A. J., Brooklyn, N. Y.
Taylor, A. B., Philadelphia, Pa.
Taylor, H. B., Philadelphia, Pa
Taylor, James A., Newport, R. I.
Taylor, John P., New Bedford, Mass.
Thatcher, H. D., Potsdam, N. Y.
Thompson, W. B., Philadelphia, Pa.
Thompson, W. S., Baltimore, Md.
Trimble, Henry, Philadelphia, Pa.
Troth, S. F., Philadelphia, Pa.
Tscheppe, A., New York.

Tufts, C. H., Dover, N. H.
Underhill, George F., Concord, N. H.
Vandegrift, John A., Burlington, N. J.
Vandervoort, R. W., Newark, N. J.
Van Patten, William J., Burlington, Vt.
Vernor, J., Detroit, Mich.
Vogelbach, H. A., Philadelphia, Pa.
Voorhees, W. H., Plainfield, N. J.
Wagner, Henry, Cincinnati, O.
Wakefield, Seth D., Lewiston, Me.
Warner, William R., Philada., Pa.
Waugh, George J., Stratford, Can.
Wayne, E. S., Cincinnati, O.
Weaver, J. T., Philadelphia, Pa.
Webb, W. H., Philadelphia, Pa.
Webster, G., Boston, Mass.
Weideman, C. A., Philadelphia, Pa.
Weinman, O. C., New York.
Wellcome, H. S., New York.
Wells, C. E. New Brunswick, N. J.
Wells, J. C., Hartford, Conn.
Wells, J. D. Cincinnati, O.
Wenck, G. J., New York.
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Wharton, J. C., Nashville, Tenn.
Wheeler, C. G., Chicago, Ill.
White, A. S., Mount Holly, N. J.
Whitfield, Thomas, Chicago, Ill.
Whiting, F. T., Great Barrington, Mass.
Wickham, W. H., New York.
Wiegand, Thomas S., Philada., Pa.
Wienges, C., Jersey City, N. J.
Wike, A. D., Marietta, Pa.
Wiley, John A., Manchester, N. H.
Wilkins, D. G., Boston, Mass.
Williams, J. K., Hartford, Conn.
Williamson, Peter, Philadelphia, Pa.
Wilson, B. O., Boston, Mass.
Winter, J., Hagerstown, Md.
Wood, A. F., New Haven, Conn.
Woodruff, R. J., Waterbury, Conn.
Wormley, T. J., Columbus, O.
Worthington, J. W., Moorestown, N. J.
Yeomans, L. W., Belleville, Can.
Zeilon, J. H., Macon, Ga.
Zellhoefer, G., New York.
Zinn, O., Chicago, Ill.

PROCEEDINGS

OF THE

TWENTY-FOURTH ANNUAL MEETING

OF THE

American Pharmaceutical Association.

REPORT ON THE PROGRESS OF PHARMACY,

FROM JULY 1, 1875, TO JUNE 30, 1876.

BY C. LEWIS DIEHL.

It is gratifying that I can at this time preface the report with a brief review of its most important contents. Hitherto this had been omitted for want of time, but the regular remittance of the journals by the Permanent Secretary has enabled me to make the extracts with regularity, and to complete the work with comparative ease. It is not claimed, however, that the report embodies all the interesting facts relating to pharmacy that have been made public during the period embraced by the report, but it is believed to furnish a very fair exhibit of the progress made.

Before asking your attention to some of the principal contents of the report, it may be interesting to allude to a few papers, which, on account of their general character, are not embraced in it. One of the most interesting papers of this nature is the translation of what is believed to be the most ancient document extant, the *Papyrus Ebers;* extracts from which have found their way into various pharmaceutical and other journals. The history of this remarkable document may be best given by quoting from an interesting paper communicated by Mr. Charles Rice to the "Medical Record:"

"During the winter of 1872–73, Dr. George M. Ebers, Professor of Egyptology at the University of Leipzig, and Mr. Ludwig Stern, of Berlin, purchased in Egypt a papyrus-roll of a size and beauty exceeding any previously known. It was found to be a complete work, measuring 30.23 metres in length, by 30 centimetres in width. The writing is on one side only, excepting near the end, where it runs over on the back; the letters are hieratic, beautifully clear and black, with frequent interspersions and marks of weights and measures in red. Its age was determined by Prof. Ebers by means of the names of the Egyptian kings mentioned in the text, and confirmed by the palæographical examination of the characters, and a calendar inscribed on the first page. The result proves this manuscript to have been written 1552 before Christ, being one of the oldest original documents which have come down to our days. It is now in the library of the University of Leipzig, where it is preserved, cut into sheets corresponding with the pages, in glass frames."

There seems to be no doubt that this papyrus is one of the forty-two so-called Hermetic books of the ancient Egyptians, thirty-six of which contained their philosophical works, and six the various branches of medical art, namely, treatises on surgery, anatomy, therapeutics, diseases in general, ophthalmology, and gynæcology; the Papyrus Ebers being the treatise on therapeutics. The work betrays an astonishing knowledge of a great variety of remedies, and shows that in the sixteenth century before our era there were learned men in Egypt, who could make intelligent observations of disease, combine complicated recipes, and use them with judgment. To the student of the history of pharmacy the work is invaluable. In connection with this subject mention must be made of a recent and very valuable contribution by Prof. Flückiger, entitled "Documente zur Geschichte der Pharmacie," and consisting of a compilation of over one hundred drug and medicine lists and tariffs of German towns, ranging from the year 1558 down to the middle of the last century, the consultation of which, as in the case of the papyrus alluded to, must prove of great value to any author engaged in the history of pharmacy.

The metric system of weights and measures has been the subject of a circular communication by the Boston Society of Civil Engineers, to the various scientific bodies throughout the United States; the object of the Society being to invite united action in petitioning Congress to fix a date after which the metric weights and measures shall be the only legal standards. The arguments offered in favor of the petition are such as have been made within this body, and need not, therefore, be repeated here. And passing from these subjects to those embraced by the report, we have as first in order,

The new balance of Prof. Mendelief, of St. Petersburg, which is characterized by its compactness and in having very short arms. It is considered that this arrangement will save much time in weighings, while at the same time it will give quite accurate results, and is not so unfavorably affected by large weights as when the arms are longer. The disadvantage of the short arms is overcome by observing the oscillation of the beam at its extremities instead of following its movements by the ordinary index needle. A new arrangement for putting the beam in motion, or arresting its oscillation, is also introduced in this balance.—Several papers on apparatus and methods of vacuum and common filtration have been devised. Thad. M. Stevens recommends the exhaustion of the receiver by means of common steam atomizers, while B. C. Buck constructs a filter-pump on the principle of Sprengel's very cheaply, with ordinary caoutchouc and glass tubing. A method of automatic filtration, which has been suggested by E. Gregory, deserves attention, and if as successful in the hands of others as it has proven in the hands of Mr. Gregory, is likely to be very generally applied. The filter is constructed by drawing a rubber siphon-tube over the nozzle of an ordinary glass syringe from which the piston has been removed; over the other extremity a piece of filtering-paper is securely tied, and the filter-siphon being now introduced into the bottle or other vessel containing the liquid to be filtered, the air is carefully exhausted by suction, when the liquid will rise through the paper, and, the current being established, filtration proceeds uninterruptedly. W. H. Seaman also recommends an automatic balance filter, which has some merits, and G. Missaghi makes some suggestions on the proper arrangement of a filter for the separation of crystalline substances entangled in large amounts of extractive matter.—The annoyance occasioned by the retreating of the flame of a Bunsen burner is overcome by Henry Morton, by a slight modification in the construction of the tube, which, being of rather large diameter, is constructed at the orifice to two-thirds its original bore, and shaped like an open-ended thimble. P. Casamajor describes a very compact portable blowpipe, and also a very useful charcoal-holder for blowpipe analyses.—From a paper by

Prof. Reichardt it becomes evident that the condensing apparatus, commonly known as "Liebig's condenser," should, in justice to the real inventor, be named "Weigel's condenser;" Prof. Weigel, of Göttingen, having described it as early as 1771.—A new method for the extraction of fresh vegetable substances, applied by Legrip, seems calculated to very materially aid the proximate investigation of plants. The process, which Legrip has named "diatheralysis," is one of maceration and displacement by ether, and is based upon the property which ether possesses to dehydrate moist vegetable substances, thereby expelling the vegetable juices from the cellular tissues, and, with these, all the principles contained in the plant, whether soluble or not. The experience of Vuaflart shows the influence that may be exerted by apparently trivial circumstances. The application of steam to the distillation of essential oils and, incidentally, to that of aromatic waters, is of comparatively recent date, and it would seem reasonable to suppose that the product, whether obtained by direct heat or by the agency of steam, should be the same. Vuaflart, however, has observed, that orange-flower water distilled by steam, while possessing at first a more agreeable odor, even loses its pleasant odor and acquires an unpleasant taste, while that distilled direct retains its properties for years. He attributes this difference to complete extraction by direct heat and incomplete extraction by steam. Machet has made similar observations in regard to rose-water.—The elixir question has not been agitated to any extent this year, and the papers on the subject are few. J. B. Moore gives formulas for elixir of hops and of elixir of valerianate of ammonium, G. W. Kennedy for elixir of guarana, and your reporter, formulas for simple and compound elixir of senna. In regard to the latter, it may be remarked that the formulas are based upon the extraction of senna leaves by stronger alcohol, in order to remove the odorous and resinous principles to which the unpleasant taste and the griping effects of senna are usually attributed, and that L. Siebold, in England, and at about the same time, also drew attention to the value of senna so extracted. While on the subject of elixirs, some thoughts, that have matured in the mind of your reporter since the question was first prominently agitated, may not be out of place. For several years this Association has found it necessary to appoint a committee on elixirs, and two reports, giving formulas for elixirs, have been received and published. The reception of each of these reports, and especially that of the last (at Boston), gave rise to considerable discussion, the drift of which seemed to show that some of our members have very little faith in their utility from a therapeutic standpoint, while others again seem to regard the whole subject too trivial for discussion in the Association; and this impression, it may be proper to state, is derived as much from the manner of the discussion at the time and place, as from the printed record in our "Proceedings." There can be no doubt that elixirs, prepared so as to represent a definite proportion of medicinal agent, are valuable adjuncts to the list of remedial agents, and it is not going too far to say that every pharmacist represented in this Association has prepared elixirs, aye, and in some instances recommended them, long before the question assumed such shape that it became necessary for the Association to adopt formulas for their preparation; and such being the case, we should neither sneer at the subject, when brought before us for discussion, nor can we regard them as worthless, except in so far as may be proven by actual experiment and analysis. Let us meet the subject fairly and squarely, and by the adoption of suitable formulas from time to time, as may become necessary, not only meet the demand of the physician, but also counteract the demand for elixirs of special manufacture. A step in the right direction is that of Joseph Le Roy Webber, who has made some interesting examinations of commercial extract of belladonna. A surprising result of these investigations is the uniform superiority of the American over the English extract; eight samples of American extracts containing respectively 2.57, 2.51, 2.35, 1.83, 1.80, 1.76, 1.70 per cent. of atropia, whilst two samples of English extract contained but 0.973 and 0.813 per cent. respectively. Similarly to Mr. Weber, Henry C. Schrank has estimated the alkaloidal strength of various fluid extracts, both authors using Mayer's solution of iodo-hydrargyrate of potassium, after freeing the vegetable solutions as much as possible from coloring matter and inert components.—An examination of the deposit formed in fluid extract of cinchona, by C. S. Johnson, proves that it contains a small percentage of alkaloids; but neither the deposit from fluid extract of ergot or hyoscyamus gave evidence of alkaloid deposition.—Experiments made by J. U. Lloyd throw some light on the difference in the character of commercial specimens of cotton-root bark. He finds the difference observed to be due to the age and the time at which the bark is collected, which is properly done in October, immediately after the cotton harvest and before frost sets in. Such bark produces a brownish-yellow fluid extract, which, however, readily changes to brown-red and forms a deposit by age, while bark collected at the improper time produces a brown-red extract at once.—According to experiments of J. Deane, acetic acid and ether will not extract the cantharidin from cantharides as satisfactorily as will acetic ether, and he therefore recommends the substitution of the latter in the formula of the British Pharmacopœia for liquor epispasticus. The turbidity of the officinal mistura glycyrrhizæ composita is an eyesore to most pharmacists, and several papers have been communicated with a view to securing clear preparations. It seems desirable that the revision of the Pharmacopœia shall adopt purified extract of licorice, or a formula for the extract, and with those properly prepared, clear preparations could readily be made. As it stands now, the difficulty is not so much in obtaining a clear preparation, for filtration will accomplish that; but in the usage of many years, which leads both physician and consumer to expect a turbid (a brown) mixture.—Dr. Méhu has devoted considerable attention to the different modes of administering phosphorus, and gives it as his opinion that the best pharmaceutic form for its administration is as solution in oil, which is preferably given in capsules, but may also be given in the form of mixture.—On page 79 of last year's Proceedings appear the abstracts of two papers on Emulsion of Cod-liver Oil made with Glyconin, which were extracted respectively from the "Druggists' Circular," for September and October. The first article is stated to give a formula for that preparation, which had been in use for a long time in the Utica Insane Asylum; the second is stated to be an improvement on the first, by Mr. George C. Close. The impression conveyed to the mind of your reporter by the articles mentioned was in accordance with this statement, but seems to have been erroneous, Mr. Close, in a private communication, making the following corrections: The preparation originally used in the Utica Insane Asylum was made with the yolks of 3 eggs, 8 ozs. of cod-liver oil, 1 oz. of dilute phosphoric acid, 4 ozs. of Sherry wine, and 8 ozs. of bitter-almond water. This was improved by Mr. Close, by the substitution of glyconin for yolk of eggs, of a small quantity of essence of bitter almonds for bitter-almond water, and the addition of aromatic spirit of ammonia; the finished product of the improved formula containing one-half cod-liver oil, in accordance with the request of a Brooklyn physician. This formula, Mr. Close states, was subsequently modified by Dr. Beard.—A method for preparing ferrated cod-liver oil, communicated by C. Bernbeck and improved by O. Wachsmuth, appears to recommend itself by being a simple and rational means of obtaining a ferrated oil. It consists in preparing oleates of protoxide of iron and dissolving this in the cod-liver oil in the desired proportion.

The pill subject has given rise to considerable controversy, turning upon the relative solubility of the officinally prepared pills and those prepared by pressure, or by coating with gelatin, sugar, etc., and participated in by Prof. Remington, Mr. Campbell, and others. Some interesting papers on pill-coating have been contributed by F. M. Goodman, Charles B. Allaire, and A. F. W. Neynaber, and Prof. Remington describes a press for compressed pills, which is an improvement on that described before the Association last year. The subject of phosphorus pills has elicited quite a number of papers. Messrs. Allen and Hanburys and W. B. Addington effect the solution of the phosphorus by means of a little bisulphide of carbon, and C. S. Denham uses chloroform for the same purpose, the solution being immediately incorporated with some dry powder (licorice, soap, etc.), during which the volatile solvent is dissipated. T. Haffenden and Eli Lilly, seem to prefer powdered phosphorus, the former reducing the phosphorus to powder in mucilage, the latter in syrup.—The administration of powders by means of wafer capsules seems to gain in favor; and justly so, for by means of the wafer nauseous medicines may be administered absolutely without taste. W. McIntyre describes a simple arrangement for making the wafers from ordinary wafer-sheets, and also a simple wafer-press devised by E. M. Boring; Willard M. Rice also offers some practical observations on the construction of a wafer-press and dispensing wafer powders, while Charles P. Lechler goes off on a tangent, and don't like wafer capsules. In connection with wafer capsules mention may be made of the so-called "devorative capsules," which are simply very thin sheets of gelatin, in which the powder is enveloped, secured by the application of moisture, and administered with their inclosure.—The preparation of suppositories is another bone of contention between "elegant" and "practical" pharmacy. The papers communicated during the past year seem to lean to the practical side of the question, although a good word is put in for the elegant side. One point seems to be lost sight of in this connection. It is this: that it should be the aim of pharmacists to do away with all apparatus that are not essentially necessary. It has been contended, and judging by the preponderating testimony, with justice, that the ingredients of suppositories can under all circumstances be mixed uniformly by the aid of the mortar and pestle, while by melting the mass and moulding—to put it lightly—a certain degree of skill and experience is required to produce a suppository of uniform composition and weight, if, indeed, this is possible under all circumstances. The only real plea in favor of the latter method is consequently reduced to the greater elegance of the product, and it seems, therefore, very questionable propriety that the revisers of the Pharmacopœia should countenance the use of apparatus, which in practice does not seem to be necessary, and, perhaps, not desirable. The use of the mould or of the mortar and pestle for making suppositories will, as a matter of course, be regulated by the individual views of pharmacists, but the real point at issue resolves itself into the question: shall the Pharmacopœia direct that suppositories *shall* be made by moulding or *may* be made by simple division by hand, and thus encourage the use of moulds; or shall it simply direct that a certain number of suppositories shall be made from a certain quantity of ingredients, and leave it to the judgment of the pharmacist to make them by the "elegant" or by the "practical" method.—Syrups, as usual, have been the subject of quite a number of papers. The method of cold percolation, recommended by Orynski, in a paper read before the Association at St. Louis in 1871, is evidently gaining in favor, and seems to be very applicable to many syrups. Robert Hunstock considers the method far superior to any of the officinal methods, and Clay W. Holmes also recommends it, with modifications of the officinal formulas in some instances, however, in order to accommodate them to the new process. Papers are contributed by Neynaber, on fruit syrups; Kuhn, on syrup of orange-peel; Hogan, on syrup of ipecacuanha; Jones, on syrup of protochloride of iron; by Hammer, and by Judge, on syrup of iodide of iron; by Madsen, on syrup of arseniate of iron; by Howie, on the phosphate syrups; and by Jehl, on the various syrups of lacto- and chlorohydro-phosphates.—William Inglis Clark reviews the various methods of making solution of chloride of iron for tincture, and communicates the method which, in his experience, yields the most uniform results. Examinations of commercial samples of tincture of chloride of iron, by Isaac R. Diller and by G. W. Hoyt, prove that some dealers do not regard honesty to be the best policy. Papers on tinctures, of various kinds, are also contributed, by Kennedy and by Moore. Among the novelties that have been proposed during the year, is medicated ice. E. Martin prepares this by freezing solutions of various medicinal agents, such as sulphurous acid, chlorate of potassium, chlorinated soda, etc., in a test-tube by means of a freezing mixture. The resulting sticks of ice are very acceptable, especially to children, in various febrile complaints. Another novelty are the tasteless quinia pastilles of Rozsenay, which are made with a sugar or chocolate mass and a carefully prepared tannate of quinia. In connection with this I may say that the method of Rozsenay for preparing tannate of quinia, which is referred to in the report for 1875 (p. 414), yields, not only a very handsome, but also a tasteless product.

Under Materia Medica we have, as first in order, a new drug, which, under the name of Coto Bark, has been introduced from Bolivia, where it enjoys a high reputation in the treatment of diarrhœa, colic, etc. Its botanical origin has not yet been determined, but its physical and microscopic characters have been studied by Prof. C. Harz. Dr. v. Gietl has experimented upon its physiological action, and Dr. G. C. Wittstein and Jul. Jobst have subjected it to chemical examination. The former finds it to contain, among the ordinary components of barks, an aromatic volatile oil and a volatile acid, while Jobst has determined, in addition to these, a glucoside, which he has named cotoin.—The chemical composition of ergot has been the subject of repeated investigations by some of the most eminent chemists, yet it is to this day not clear to what precise principle its activity is due. Experiments recently made by Prof. R. Buchheim, and since then by Prof. Dragendorff, throw a new light on the subject, and promise at last to unravel the mystery of its complex composition. Buchheim finds that there exists in ergot a colloidal substance resembling gelatin, which he regards to be the substance to which the activity of the fungoid growth is due. Its action is, however, not direct, but seems to be dependent in its ready decomposition, during which leucin, trimethylamin, and ammonia are formed. Dragendorff's experiments are stated only in a preliminary notice, but also prove the colloidal character of the active substance. His experiments seem, however, to have been more comprehensive than those of Buchheim, he having found two distinct colloidal bodies, both of which are active, together with a number of other new and more or less active substances, among which several well defined crystalloids. An interesting paper on the growth and distribution of ergot on various grains, the condition most favorable to or retarding its growth, etc., has also been contributed by S. Stephen Wilson, his observations being confined, however, to a locality in Scotland. A review of the literature upon Lolium temulentum, supported by experiments, incline Dr. G. C. Wittstein to the opinion that the poisonous character of the seeds of this graminea are due to an acrid fixed oil and a glucoside, as determined by H. Ludwig and L. Stahl.—Calmberg details some comparative experiments made with genuine arrowroot and other starches, by which he determines that the muriatic acid test is not reliable, maranta starch, as well as that from manihot, showing under certain as yet unexplained conditions entirely different behavior to muriatic acid.—F. Tiemann and W. Haarmann communicate a method for the quantitative estimation of vanillin in vanilla, and have found this principle most abundant in Bourbon and Java vanilla, while the most valuable variety, Mexican vanilla, contains the least. In the former varieties the aromatic principle is associated with an unpleasantly odorous substance, and the Mexican article is, therefore, preferred. A. v. Roretz communicates some interesting information on the production of camphor in Japan, from which it appears that Laurus camphora is the sole source of the Japanese camphor of commerce.—In the report communicated to the Association in 1873 (Proceedings, p. 211), the successful cultivation of a species of rheum, claimed to be that from which our supplies of Chinese rhubarb are derived, was referred to. Since then specimens of the plant have been successfully cultivated in various botanical and private gardens in Europe, and among these the plant has flowered in the garden of the Pharmaceutical Institute of the University of Strasburg, where Prof. Flückiger has had opportunity to observe it. The results of his investigations prove that in Rheum officinale, as the plant has been designated by Prof. Baillon, we possess for the first time a plant, the root of which corresponds with true rhubarb, and there seems little room for doubt that this plant yielded the rhubarb formerly obtained from Thibet, and it is very likely that it yields a large portion of the rhubarb now received from China.—An apparently very closely allied plant seems to yield a new drug, which, under the name of Raiz del Indico, is used by the natives of Mexico as an astringent. R. F. G. Voelker draws attention to this drug, which, as well as some plants he succeeded in raising from the roots, he describes.—The existence of an alkaloid in capsicum has long been a subject of controversy. I. C. Thresh has isolated from the fruits of the capsicum now found in commerce (C. fastigiatum) a very small percentage of an alkaloid resembling conia, but he finds it entirely devoid of acridity.—H. S. Wellcome draws attention to a new remedy, reported to be a cure-all for consumption, the Eriodyction Californicum, and after describing the plant communicates formulas for various galenical preparations from the leaves. Recent investigations of Jobst and Hesse seem to show that, contrary to the results of Hildwein and of v. Gorup-Besanez, dita bark (Echites scholaris) does not contain a very large percentage of alkaloid, and that it exists in but trifling quantities and of an entirely different character from that described by these authors. Besides the small percentage of alkaloid, Jobst and Hesse have isolated and describe a series of allied substances, which they have named respectively Echicaoutchin, Echicerin, Echitin, Echitëin, and Echiresin.—Cichorium Indicum is found by R. Neitzki to contain a well-defined crystalline glucoside, for which, however, he has not proposed a name.—The family of the Rubiaceæ is as usually largely represented by the cinchonas. Experiments made in the Mauritius on the cultivation of cinchonas seem to prove that some varieties, particularly C. succiruba, thrive well, but unfortunately the plantations are subject to damage by periodical hurricanes. Analyses made of young barks show very fair results, and it is, therefore, suggested to establish a system of cultivation, as proposed by Dr. De Vrij, whereby the young plants are cut down when three or four years old, in order to have the bark from the root, which, in an analysis made by De Vrij and Howard, was found to contain the enormous quantity of 12 per cent. of alkaloids. Favorable reports have also been received from Isle de Bourbon, where the cultivation of cinchonas is altogether dependent on private enterprise; but while the young plantations have not suffered severely by cyclones, they seem to have a decided enemy in the enormous blue-green caterpillar of the Oleander sphinx, which has been known to destroy the foliage of entire trees during a single day. On Ceylon, C. succirubra and C. officinalis seem to thrive well; C. calisaya is not so readily propagated by cuttings, and recourse must be had to seedlings, which are not likely to be constant in character. Analyses of cultivated East Indian barks, made by B. H. Paul, are also very favorable, and prove t at C. officinalis or East Indian crown bark are far superior to C. succirubra, yielding from 4 to 6 per cent. of quinia, in a totality of alkaloids ranging between 5 and 8 per cent. The total yield of alkaloids from East Indian succirubra bark is also favorable, but the proportion of quinia seems to be small, ranging between 1.5 and 2.5 per cent. Referring to Dr. Paul's paper, Dr. De Vrij draws attention to the importance of determining the total alkaloids of barks, all of which possess febrifuge value, and also to the importance, pharmaceutically considered, that the quantity of alkaloids extracted by cold water alone be determined. Taking the results previously communicated, together with those communicated during the past year, we need have no apprehension that the supply of good bark, and of the cinchona alkaloids, will at any time give out, since various species have been successfully acclimatized in many parts of the globe, and the plantations are being increased from year to year. Reference may be made in this connection to several methods suggested for the rapid assay of bark, which will be found in the body of the report.—But while the reports on cinchona cultivation are very encouraging, those upon the cultivation of ipecacuanha in India are not so. The unusual cold weather during a portion of the season destroyed a large number of the young plants, and Dr. King regards it doubtful whether ipecacuanha can be successfully cultivated as an outdoor crop in British Sikhim; further trials are, however, not abandoned.—Prof. Dymock, of Bombay, has communicated interesting papers on the commerce of the "Hing," and of ammoniac of the Bombay markets, and J. R. Jackson gives some interesting information in regard to the commerce of ginseng, and its application and value in China. He remarks, in this connection, that large quantities were at one time exported to China from the United States, but that American ginseng is now generally rejected. Ginseng being readily disposed of to dealers in our Southern and Western cities, and ruling at fast prices, seems to be evidence that there is still a large foreign demand for it, and this is doubtless for export to China. Mr. Jackson may, therefore, be misinformed on this point.—The observation of Hale, that Hydrastis Canadensis contains, besides berberina and hydrastia, a third alkaloid, has been confirmed by J. C. Burt, who describes the method of its preparation and its character.—In contradiction to the statement in "Pharmacographia," that the poisonous qualities of Aconitum napellus are not developed in certain localities, Prof. C. D. v. Schroff finds that the poisonous properties of the aconites are not materially affected when growing wild in different localities, but that the root and herb of some species are destitute of poisonous properties.—Jaborandi has elicited a number of additional papers during the past year. Dr. Theodore Peckolt, whose numerous contributions on Brazilian Materia Medica will be remembered, confirms the previous statements that the term "jaborandi" is locally applied to numerous South American (Brazilian) drugs. He believes the true jaborandi to be Serronia Jaborandi, Guill., which is popularly known as jaborandi, in the province of Rio de Janeiro, while in some other districts it is called "jaborandi do mato." He had determined this variety to contain a volatile oil, which he examined as early as 1861. E. Schaer reviews the history of jaborandi, and communicates the results of his investigations, which agree in many respects with those of previous experimenters. E. Hardy has made a comprehensive chemical investigation of the jaborandi, derived from Pilocarpus pennatifolius, which proves the composition of the drug to be quite complex. Besides the alkaloid, pilocarpina, he obtained a second alkaloid, and a volatile crystalline body possessing apparently acid properties. Mr. Gerrard has also continued his experiments, which, while bringing much that is new, in the main confirm his experiments previously made. The second alkaloid of Hardy he considers to be chloride of potassium, which is an abundant constituent, but he has also observed indications of the presence of a second base.—The marvellous tonic properties attributed to coca leaves seem by recent investigators to be, in part at least, justified by experience. P. L. Simmonds reviews the literature upon the subject, and communicates some interesting points in reference to its cultivation, preparation for commerce, etc. Manuel A. Fuentes has contributed a monograph on the same subject.—Under the name of Tayuya a new drug has been introduced in France from Brazil, where it enjoys high reputation in the treatment of syphilis. It consists of roots, which are evidently derived from Bryonia Tayuya, and are described, as received in France, by Stanislas Martin, who also gives formulas for various galenical preparations.—The botanical origin of damiana, a drug which was received with suspicion by reason of the very questionable method of its introduction, has been determined during the past year. Three varieties seem to have found their way to the markets, and are described by H. S. Wellcome. Two of these, obtained respectively from San Francisco and the person who originally introduced damiana, have been determined by E. M. Holmes to belong to the natural order Turneraceæ, and are probably derived from Turnera microphylla; the third variety is evidently derived from a composite plant, doubtless Aplopappas discoideus, D. C.—Prof. Dymock has contributed a valuable paper on Myrrh and allied gum-resins. He includes under this head true African myrrh, Arabian myrrh, common African bdellium, scented African bdellium, Indian bdellium, and opaque bdellium, all of which are brought to Bombay from Africa, Arabia, and different parts of India, for selection and dispatch to suitable markets in Europe, China, and other countries.—The commercial examination of black pepper has engaged the attention of A. Wynter Blyth, who communicates his results, together with the methods by which they were obtained, and appends to his paper a bibliography, embracing the publications most suitable for consultation in this connection.—The purification of gutta percha is the subject of a paper by G. E. Wilmarth, and Mr. Cross reports favorably on the feasibility of cultivating the india-rubber tree. J. Herz has examined a resinous substance introduced from Mexico under the name of "Goma de Sonora," and finds it to be crude shellac. He ascertained in this crude shellac the presence of a peculiar acid, sarkosinic acid, to which, perhaps, the medicinal virtues claimed for the drug are attributable. Interesting papers on the collection of turpentine in the Bernese Jura, by Prof. Flückiger, and in Northwestern France, by Petzold, have also been contributed.

Passing to inorganic chemistry, we have some experiments made by E. Schöne, on the various reagents proposed for the determination of peroxide of hydrogen, from which he concludes that, while the ferrocyanide of potassium and perchloride of iron test and Struve's alkaline oxide of lead test are the most sensitive, Schœnbein's iodide of potassium and starch paste test is the most available on account of its certainty.—S. Lupton has tried and recommends the process of V. Harcourt for preparing nitrogen, which consists in mixing air with ammonia and passing the mixture over heated copper turnings. The process is based on the reduction of the oxide of copper as fast as it is formed, and this reaction goes on as long as ammonia is present, water and nitrogen being the sole products. Champion and Pèllet have made some experiments upon the formation and behavior of iodide of nitrogen; E. Luck has obtained a new compound by the union of peroxide of nitrogen with phosphate of magnesium; the action of nitric acid upon copper, mercury, etc., has been studied by J. C. Acworth; Vogel proposes a method for its detection in potable waters, and H. Schwarz communicates a method for its continuous formation from ammonia, which is suitable for lecture experiments.—E. Polacci has made some interesting researches on the oxidation of sulphur, and R. Weber draws attention to the existence of a sesquioxide of sulphur, which appears to be the intensely blue body referred to by Buchholz, as early as 1804, as occurring during the distillation of a mixture of sulphur and fuming sulphuric acid.—Sprengel's application of atomized liquids in operations, where a liquid is made to act as an absorbent of a gas, has been applied by him to the manufacture of sulphuric acid, pulverized or atomized water being injected into the chambers as a substitute for steam. The application effects a great saving in fuel, and is regarded very favorably. A new distilling apparatus for sulphuric acid, partly constructed of lead instead of platinum alone, has been designed and introduced by Faure and Kessler in a large number of acid works in France, and Scheurer-Kestner has made researches on the causes of the wearing of platinum retorts (which are usually supposed to be mechanical), and concludes the wearing away to be due to actual solution of the platinum owing to the presence of nitrous compounds.—Thorn proposes hyposulphite of sodium for removing arsenic from chamber acid, and R. Wagner, referring to this method, states that the similar method of H. A. Smith, in which sulphide of sodium is used, is to be preferred. If hyposulphite is used, however, it is best to use it in the form of hyposulphite of barium.—Finally, A. Girard and H. Morin communicate some interesting statistics on the quality, source, and consumption of pyrites in France.—A new crystalline hydrate of hydrochloric acid has been observed by J. Pierre and E. Puchot, who obtained it by subjecting commercial hydrochloric acid to a very low temperature. O. Opl offers some practical observations on the manufacture of chlorinated lime, and F. Kopfer submits his views on the nature of its decomposition by mineral acids.—Rudolf Wagner has made a series of interesting experiments upon the industrial application of bromine to the extraction of mercury from cinnabar, gold from pyrite cinders, and to other purposes, and G. Kilpius finds that bromine water can be very conveniently substituted for chlorine water for the separation of nickel from cobalt, as also in numerous other operations.—A. Bertrand recommends bromide of calcium and dilute sulphuric acid for the preparation of gaseous hydrobromic acid, which, as is well known, cannot be prepared without decomposition from alkaline bromides by the action of sulphuric acid.—Experiments made by O. Brenken seem to prove the non-existence of pentachloride of iodine, the existence of which has long been held in controversy; Come has observed a new and available reaction for iodates; G. Pellagri recommends a new method for the conversion of iodates into iodides, and Bilz has determined that the method of Melckebecke for the detection of bromide in iodide of potassium, which had been unfavorably criticized, to be reliable within the limit claimed.—A series of experiments upon the basicity of phosphoric acid have been made by Berthelot and Longuinine. Phosphoric acid is not a tribasic acid of the same kind as citric acid, as the third equivalent of base is separated from phosphoric acid by the feeblest actions, and even by dilution. R. Rother also makes some remarks on the basicity on the acids of phosphorus. Benoit proposes neutral crystallized citrate of bismuth for the titration of phosphoric acid, and the method may reciprocally be applied to the titration of bismuth solution. E. B. Shuttleworth prefers to make dilute phosphoric acid by the action of nitric acid upon phosphorus alone, and maintains that nitric acid of sp. gr. 1.24 may be safely used, while the process is quite expeditious. The papers on phosphoric acid, contributed to the Association at our last annual meeting, are doubtless familiar to you. The unfortunate accident to our fellow-member, Dr. Pile, has elicited a number of papers, from which it appears that the process is perfectly safe if proper care is exercised. Prof. A. D. Prescott, however, suggests that the process of the Pharmacopœia works exceedingly well, and is perfectly available to pharmacists. To this may be replied, that, while the process of the Pharmacopœia readily forms a good product, the fumes given off are quite troublesome, while by the process of Professor Markoe no such trouble is experienced.—The industrial production of animal charcoal at Aubervilliers, near Paris, is the subject of a communication by Dunod and Bongleux, while Melsens communicates a series of experiments on its power of absorption and condensation of dissolved bodies.—Sidot has discovered that the red flocculent matter formed in bisulphide of carbon, when it is exposed to direct light for some time, is a definite compound, monosulphide of carbon, and Sergius Kern gives a method of its preparation, and also for depriving bisulphide of carbon of its disagreeable odor.—Sulphocarbonates, which have been so highly recommended for the destruction of phylloxera, have been the subject of comprehensive study by A. Gelis, the results of which are embodied in the report. Papers on the same subject have also been contributed by Mermet, Delachanal, and by Rommier.—Under cyanogen compounds we have a paper by Sokoloff, on hydrocyanic acid, according to which it is possible to detect its presence in the stomach twenty-two days after death; Cazeneuve attributes its ready decomposition to the presence of cyanide of ammonium; Chichester A. Bell recommends a rapid and convenient method for preparing cyanate of ammonium; while Vidau draws attention to a series of new cyanogen compounds, the cuprocyanides, which are analogous in their constitution to the ferrocyanides. Commencing with the metals, we have the observation of Stolba, that the behavior of various boro-fluorides to solution of salts of potassium serves an excellent purpose for the determination of the latter in some cases. L. Siebold communicates methods for obtaining various pure salts of the alkali metals, such as carbonates, nitrates, and chlorides. Dibbits has ascertained the solubility of the bicarbonates of potassium, sodium, and ammonium in water at various temperatures; M. M. Pattison Muir, that of perchlorate of potassium under similar conditions; and Steverin finds an extract of violet or mallow flowers in glycerin an excellent reagent for alkalies. Baudrimont communicates a paper on the formation and constitution of the crystals of monosulphide of sodium, and George Fitzroy Cole makes a valuable contribution in a description of the working of the saltpetre deposits of Peru. Some speculation on the natural formation of ammonia, by Schlösing, will be read with interest; Esilmann gives a method for purifying sulphate of ammonium; Yvon recommends two methods by which bromide of ammonium may be conveniently obtained; A. W. Hoffmann and F. Filsinger describe methods by which carbonate of lithium is prepared from lepidolith, and Lescœur describes a process for making bisulphate of lithium. The observations of Frémy seem to indicate the existence of a new oxide of manganese, but the details of his observations are reserved for a future communication. Jesler proposes a new method for regenerating peroxide of manganese, and T. L. Phipson draws attention to some errors in the commercial analysis of peroxide of manganese as ordinarily performed. The iron compounds are represented by papers: on the Antiseptic Properties of Perchloride of Iron, by G. Almes; on Tasteless Iron Compounds, by C. Rutter and by R. Rother; on Saccharated Carbonate of Iron, by W. L. Howie; on Phosphates of Iron, by Rees Price and by Fausto Sestini; and on a Crystallized Ferric Sulphate, observed by O. Meister. J. E. Loughlin contributes methods for preparing the double chlorides and sulphates of nickel and ammonium, and a writer in the "Scientific American" furnishes a formula for obtaining pure sulphate from commercial nickel. Papers on advantageous methods of nickel-plating are also contributed.

Sergius Kern proposes ferrocyanide of potassium as a reagent for uranium compounds, and T. Fairley has observed a new oxide of uranium. Commercial phosphide of zinc is, according to Pierre Vizier, largely composed of oxide and phosphate of zinc, and this is not owing so much to intentional fraud, but to the method used in its preparation. The formula in the work of Soubeiran, revised by Regnault, furnishes a true phosphide. Among the most interesting results during the year is the discovery of a new metal, *gallium*, by Lecoq de Boisbaudran. Like the comparatively new metals, indium and thallium, it was discovered by the aid of the spectroscope, and in similar association, it having been found in zinc blende from Pierrefitte, in the Pyrenees. The new metal, in concentrated solution with chloride of zinc, produces a spectrum, which is composed chiefly of a narrow violet-colored but very distinct line, corresponding to a wave-length of 417; a faint line was also noticed at 404. The papers on copper embrace some analytical methods, and the preparation of sulphide and of phosphide of copper. C. Friedel and I. Guerin find an analogy to silicium in certain compounds of titanium, and Sergius Kern communicates a method for the preparation of the metal. J. W. Mallet has made interesting experiments on the action of hydrochloric acid on alkaline tungstates. L. Siebold draws attention to some imperfection in the British Pharmacopœia processes for subnitrate, subcarbonate, and oxide of bismuth, and suggests certain modifications by which uniform products are secured. Several methods for the detection of arsenic in various associations and conditions have been proposed, some of which are new, while others are in support of old and well-tried methods. Antimony is represented by papers on pentachloride, oxychloride, and kermes mineral. Dr. Geests communicates some interesting information on the manufacture of calomel in China and Japan; Norman A. Kuhn has ascertained, by experiment, that the action of bromides on calomel, in the presence of water, results in the formation of some mercuric bromide; attention is drawn to an explosive reaction when iodine is mixed with white precipitate and the mixture is moistened with alcohol, and Professor Flückiger, referring to this subject, finds that decided reaction occurs, although not accompanied by explosion, when iodine and white precipitates are mixed dry in certain proportions, and the mixture is allowed to stand undisturbed. G. Gramp communicates a method for the quantitative analysis of cinnabar. Charles L. Mitchell, a modification of the officinal processes for red iodide and yellow oxide of mercury, and C. A. Cameron makes some remarks on the character and formation of iodate of mercury. H. Debray finds that silver, containing 99.8 to 99.9 per cent. of pure metal, sometimes contains selenium, which seems to be introduced by the sulphuric acid used in its purification, and states that in this condition it is not adapted for the preparation of industrial alloys. Methods for the preparation of thallium from flue dust are communicated by G. Krause and by R. Nietzki. H. Saint Claire Deville and H. Debray contribute papers on the specific gravity of platinum, and that of its alloy with iridium, and also on the physical characters of osmium, with which this portion of the report is concluded.

Organic chemistry takes up as usual a large share of the report. The extensive application of nitrobenzole, under the commercial designation of oil of mirbane, and its undoubted poisonous character, have led E. Jacquemin to make a series of experiments, upon the basis of which he recommends methods for its toxicological determination. Incidentally his experiments have led to a new method for its reduction, which is based upon the facility with which alkaline solutions of protoxide of tin pass into the condition of binoxide. G. H. Beckett and C. R. Alder Wright have determined the identity of cymen as obtained from various sources, such as the hydrocarbons of orange, nutmeg, and cajuput oil, from citronelol, myristicol, absinthol, menthene, etc. S. Lupton finds naphthalin to be slightly soluble in water, its volatility having hitherto prevented the determination of this fact. The subject of vaseline has engaged the attention of our British colleagues, papers on the subject having been read before the Pharmaceutical Society by J. Moss and A. W. Gerrard. The views of these gentlemen, as well of some of those who participated in a discussion on the subject, seems to be very favorable to its introduction as a therapeutic agent, and it seems evident that both vaseline and eosmoline are not regarded in the light of nostrums, but their source having been indicated by the manufacturers they are accepted as legitimate products. The discussions on the same subject at some of our meetings indicate a different view on this side of the Atlantic. An interesting paper on the various methods employed for the extraction of volatile oils, including those which can only be extracted by infusion or absorption, has been communicated by P. Perrenoud. O. Osse proposes a simple method for the quantitative determination of volatile oils, which seems to require further investigation, however. Prof. Dragendorff reports further results on an original method for the detection of adulterants in volatile oils, which we referred to in the report for 1873. Papers have also been communicated upon the oils of turpentine, peppermint, cubebs, Roman chamomile, orris, cloves; on anethol, mellilotol, various stearoptens, resins, etc. T. T. Monell proposes a method for the volumetric determination of ethylic alcohol, which is ingeniously based upon the variable intensity of the blue color produced by the solution of sulphocyanide of ammonium in alcohol of different degrees of strength, and the final disappearance of the color on sufficient dilution with water. Dupré gives methods for estimating methylic and amylic alcohols in whisky; A. W. Miller advocates the introduction of pure rectified spirit of commerce into the Pharmacopœia, in lieu of whisky and brandy; and Gutzeit has determined the natural occurrence of ethylic alcohol, or of one of its ethers, in certain fruits. E. Bourgoin gives a method for preparing perchloride of ethylen, which yields better results than that originally pursued by its discoverer, Faraday. Some interesting examinations of commercial spirit of nitrous ether have been made by Griggs and by Kennedy, which prove the importance of preparing it in the pharmaceutical laboratory instead of depending on the manufacturer. Experiments of J. Creuse indicate that spirit of nitrous ether possesses considerable power as an oxidizing agent on organic substances, especially tannic acid. W. Ramsey communicates a paper on the preparation and some of the properties of ethylthio-sulphate of sodium. H. P. Madsen makes some practical observations on the production of pure chloroform, and Dr. C. Schacht again draws attention to the fallacy of the assertion that chloral-chloroform, being absolutely pure, is not as prone to undergo decomposition as that made direct from alcohol, and supports his opinion by experiments. The paper refers particularly to the product of "E. Schering & Co., of Berlin," who make the aforementioned claims in regard to their chloral-chloroform. This firm has for years secured gratuitous advertisements, both in Europe and the United States, by a class of contributions to the journals, which, under the guise of "original investigations," really consisted mainly of extracts from the current or standard literature, and were accompanied only by such "original" matter as served their own ends and purposes. These communications are usually worded in a manner calculated to deceive the general reader, but even the most superficial reader must be struck with the extremely unsatisfactory character of the information contained in them, and the evident prominence which it is sought to give to the special products of "E. Schering & Co." The preparation of iodoform has engaged the attention of H. M. Wilder, and McElhennie makes some remarks on its solubilities. Interesting papers on chloral, croton-chloral, and chloralid have been contributed by Krämer and Pinner, who have found that croton-chloral is more properly named butyl-chloral, since it contains two atoms more of hydrogen than it was originally supposed to contain. Friedel communicates a paper on methylic and chloro-methylic oxide, and Girard gives the result of his experiments made to overcome the explosive tendency of the nitrate of methylic oxide, which is a great drawback to its industral application. Volatile oil of mustard has long been known to be identical in composition with sulphocyanide of allyl, but the latter is entirely free from the pungency of the mustard product. It has now been found by O. Billeter that when sulphocyanide of allyl is heated to a certain point it is converted into an isomeric that possesses all the properties of volatile oil of mustard; Gehrlich claims to have discovered this fact previously, and makes some additional observations on the conversion. W. F. Koppeschaar proposes bromine-water for the volumetric determination of carbolic acid, and Prof. Jacquemin has discovered a very sensitive test for its presence; the latter depending on the formation of the intensely blue erythrocarbolate of sodium, by the action of hypochlorite of sodium. Champion and Pellet communicate a qualitative method for the analysis of glycerin, and have compiled an elaborate table of its specific gravities; Dr. Roos and A. Henninger have severally obtained and experimented with crystallized glycerin; A. Zeller and G. Hüfner describe an exceedingly simple method for preparing glycol, and Barbier describes fluorenic alcohol. Under the caption of fixed oils we have interesting papers; by Burstynn, on a method for determining free fatty acids in fixed oils; by S. Cohné, on the availability of peroxide of hydrogen for distinguishing between drying and non-drying oils; by Gilmore, on the availabilty of the spectroscope to the recognition of fixed oils and their adulterants; by J. C. A. Beck, on a new method for the decomposition of neutral fats without final distillation; by A. Cahours and E. Demarçay, on some volatile products obtained during the decomposition of neutral fats by superheated steam; and by Whitelaw, on the direct formation of soda soaps from fats with common salt and ammonia.

A new test for the purity of castor oil is proposed by Dr. Hager; Kühn makes some remarks on the clear croton oil at present found in commerce, which he proves to be as effective as the turbid oil formerly produced; and W. Dymock communicates some experiments made with a view to determining a method by which adulterations with inferior oils may be detected in the chaulmogra oil of Indian commerce. Passing from the fixed oils to the carbohydrates we have as first in order, hydrocellulose, which ranges itself along with normal cellulose, and the gelatinous cellulose of Béchamp, as a third variety. This form has been observed and is described by A. Girard. Mark W. Harrington, in a serial paper on the microscopic examination of powdered drugs, gives some valuable information on the microscopical distinction of commercial starches. Anthon recommends a process for the preparation of dextrin from the entire potato, by which a considerable saving is effected. Neubauer's experiments upon arabin (communicated in 1854) have been repeated, and his results confirmed by C. Barford, and the results of C. Scheitler with arabin from beet-root, mentioned in the report for 1874, have been in the main confirmed by Prof. E. Reichardt, who, however, also obtains an indifferent body bearing close relation to arabin, which has been named pararabin. Kirchner and Tollens have made some comparative experiments upon the mucilages of quince, linseed, and fleabane. A number of papers on sugars have been communicated, among which that of A. Petit, detailing some observations on a new starch sugar resulting from the action of diastase on starch under certain conditions, may be mentioned as most interesting.

Organic acids form a large part of the section devoted to organic chemistry. Lorin has contributed a paper on the most available source of concentrated formic acid; Witz and Thresh on the determination of free mineral acids in vinegar; and Prescott on the determination of acetic acid in presence of fixed acids and extractive matter. J. B. Barnes has communicated an important paper, detailing the solubility of glacial acetic acid in various fixed and volatile oils; and this paper is supplemented by one of W. H. Symons, drawing attention to operating with acetic acid of the proper strength. The subject of salicylic acid has engaged the attention of chemists during the past year, chiefly in reference to its antiseptic value, and has led to considerable controversy, the merits of which can be decided by time and experience alone. Such papers, as have been deemed directly important to the pharmacist, have been extracted, but much had necessarily to be omitted to make room for those of a more practical character. E. Burgoin has communicated a paper detailing experiments on the solubility of succinic acid, and S. Lupton has determined some new reactions. The most voluminous, and one of the most valuable papers contributed during the year, is that of R. Warrington, on the chemistry of tartaric and citric acids, which especially treats of the methods of analysis and the sources of the materials with which the manufacture of these acids is concerned. The paper is important as coming from one who has abundant experience in the manufacture of these acids. C. Umney draws attention to the inaccuracies in the United States and British Pharmacopœia processes for preparing citrate of lithium, the proportion of alkali to acid being in neither instance either theoretically or practically correct. He advocates the introduction of the crystallized salt, which, as well as the officinal salt, is not deliquescent, as is usually supposed. The inaccuracy of the United States formula has doubtless been observed by those making the salt, and it should be changed so as to require a sufficiency of carbonate of lithium to make a neutral solution. The same is true of some other processes of the Pharmacopœia—that for citrate of potassium, for example. Commercial chemicals, even when of guaranteed purity, are by no means uniform, and hence the products made from them must vary to a greater or less extent when definite quantities are prescribed. A paper, by A. Dupré, on meconic acid, draws attention to the importance of carefully removing phosphoric acid, which in a forensic determination for opium may be present along with meconic acid, before applying the ferric color-test, since, similar to the blood-red color produced by ferric salts upon sulphocyanides, phosphoric acid and phosphates are capable of destroying the color produced by meconic acid. Among numerous other papers on organic acids may be mentioned that of Herz, detailing the method of obtaining and the characters of the new acid, sarkosinic acid, from the goma de Sonora already alluded to. Tannic acid is also represented by a number of interesting papers, comprising descriptions and experiments with particular tannins, and methods for determining tannin quantitatively. Alkaloids are represented by a large number of papers. J. B. Barnes suggests the pharmaceutical exhibition of alkaloids in solution with glacial acetic acid, the solubility of which in oils renders such solution very available for topical applications. Prof. E. Selmi proposes a new reagent for morphia. Matthieson and Foster have made some interesting experiments on the constitution of narcotina, and the conditions under which it is split into meconin and cotarnia, or into opianic acid and hydrocotarnia. O. Hesse has established the identity of opiania with narcotina; and G. H. Beckett and C. R. Alder Wright have determined some interesting facts in regard to the constitution of salts of narceina. Cinchona alkaloids are represented by valuable papers; on iodosulphate of chinoidin as a reagent for the determination of quinia, by Dr. De Vrij; on salicylate of quinia, by Jul. Jobst; on phenol compounds with neutral salts of quinia, such as sulphate, chlorhydrate, and bromhydrate, by Jobst and Hesse; and on sulphophenate of quinia, by S. Cottor; on conchinia (Pasteur's quinidia), by Jul. Jobst; and on quinicia and cinchonicia, by O. Hesse. Sonnenschein's statement, that brucia is by the action of nitric acid converted into strychnia, is not corroborated by the experiments of A. J. Cownley, whose results are detailed in the report. Thibault finds that crystallized hyoscyamia cannot be obtained by the methods of the German authors, and he communicates a method by which he has obtained it. Among the most interesting American papers communicated are those of Charles Bullock and T. G. Wormley, on the alkaloids of Veratrum viride. Mr. Bullock, who has studied the subject for many years, maintains that jervia is the sole alkaloid of Veratrum viride; that the so-called veratroidia is a mixture of jervia and a light-colored resin, which seems to have the property of rendering jervia soluble in ether; and that veratria does not exist in Veratrum viride. Prof. Wormley, on the other hand, claims that, besides jervia, Veratrum viride contains also veratria. It is to be regretted that Prof. Wormley found it proper to use a fluid extract of Veratrum viride for his experiments, rather than to use well-identified roots of Veratrum viride. The changes to which vegetable proximate principles are subject during their extraction, as well as under certain other conditions, are far too little understood to warrant experimenters to assume an unchanged condition in commercial products. Prof. Wormley's analysis can, therefore, only apply to a commercial product of Veratrum viride root, and not to the root itself. C. R. Alder Wright has determined the ultimate composition of some aconite alkaloids prepared by T. B. Groves, and previously described by him in the "Year-book of Pharmacy." The new base, which Mr. Groves believed to be identical with the "atisine" of Broughton, proves to be distinct from this. A difference in composition was also observed in aconitia, as prepared from different batches of root of the same plant, and also between aconitia from A. Napellus and from A. Ferox. It remains to be determined whether these differences are owing to different pre-existing alkaloids, or to changes occasioned by the processes of their preparation. A. Commaille communicates a method for the preparation of caffeia, and has ascertained its solubilities in various solvents. Prof. Flückiger has made observations, which lead him to suggest the applicability of colchicia (or a crude solution readily obtained from a few seeds) for the detection of free mineral acids in organic acids. A. Glénard gives a new process for preparing pure emetia. Ch. Tauret describes a new alkaloid from ergot of rye, which he has named ergotinin. Jobst and Hesse give the method by which they have obtained ditamia from dita bark, and describe its character. W. Marmé communicates a simple process for isolating taxina from Taxus baccatus; the characters of oleandria, as prepared by the method of Lukowski, are described by C. Betteli; and, finally, a few papers on anilin, regarded as of interest to the pharmacist, completes the subject of alkaloids. Among these, the observations of Anton Guyard, upon the action of certain vanadium compounds on chloride of anilin, are of special interest; these compounds converting the anilin salt into anilin black, when applied in such small quantities as to resemble a catalytic rather than a chemical process. The glucosides and neutral proximate principles are represented by papers on salicin, by Maclagan; on phloridzin, and on quercitrin, by Löwe; on asparagin, by Mercadante; on glycyrrhizin, by Roussin; on gentisin, by Hlasiwetz and Habermann; on hesperidin, by Hilger, and by Paterno and Briosi; on dulcamarin, by Geissler; on cotoïn, by Jobst; on santonin, by Sestini; on cantharidin, by Bequin; and on aloin, by Mitchell and by Tilden. Among these, the paper on glycyrrhizin is of special pharmaceutic importance, since it explains the variable quality of licorice and its preparations. Roussin finds glycyrrhizin, when perfectly pure, to be nearly tasteless, owing to its insolubility in water, and that it exists naturally in the form of an ammonia-compound, which is freely soluble in water. Extracts of licorice having undergone partial (acetous) fermentation, are, owing to the liberation of a portion of the glycyrrhizin, less sweet than those in which no fermentation has occurred. Some further interesting results, on the artificial production of vanillin and vanillic acid, have also been obtained by Tiemann, among which its synthesis, from carbolic acid and from eugenol, merit special mention. Coloring matters are represented by a paper of Küpfer, detailing the comparative value of various natural and artificial coloring matters; on the preparation of indol from albumen, by Nencki; on the preparation of pure litmus, by Wartha; on the formation of alizarin from rufigallic acid, by Widman; on chrysophyll, by Hasten; on the application of phyllocyanin as a reagent, by Pellagri; on xylindëin, a green coloring matter, produced upon certain decaying woods, by Liebermann; and on the coloring matter of wines, by Stierlin and by Sulzer. Under albuminoids, we have communications by G. Witz, on the restoration of albumen, and the sp. gr. of its solution; by Heynsins, Winogradoff, and others, on its determination in animal fluids; by Mercadante, on its power of dividing precipitated phosphate of calcium; and, by Prof. Bamberger, on a soluble albuminate of mercury. Ferments are represented by a paper on a peculiar component of yeast, determined by Donath, which possesses the power to convert cane sugar into invert sugar; and by papers on pepsin and on pancreatin. Finally, urinary and biliary compounds are represented by papers: on the determination of oxygen in urine; on the properties of uro-chloralic acid, found in urine after the administration of chloral; on the preparation of urea, by Bell; and on its examination, by Pekelharing; and on a simple method for the detection of biliary coloring matters in urine.

PHARMACY.

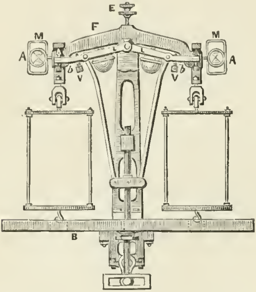
APPARATUS AND PROCESSES.

Mendeleief's New Balance.—In the "Bulletin de la Société d'encouragement pour l'Industrie Nationale" (May, 1875, p. 241), an account is given of a new balance, designed by Prof. Mendeleief, of the University of St. Petersburg. In the "Pharm. Journ. and Trans." (March 11th, 1876, p. 725), the following abstract of the "Ninth Report of the Warden of the Standards" (H. W. Chisholm), appears, and gives a lucid explanation of this important invention:

The peculiarity of M. Mendeleief's balance, is that *it has very short arms.* It is considered that this arrangement will save much time in weighings, whilst at the same time it will give results quite as accurate as those given by balances of precision, with arms of greater length. Although the long arms of balances now in use are not theoretically required, they have been considered practically necessary as increasing the sensibility of the balance. M. Mendeleief's balance was constructed by M. Salleron, of Paris. Its beam is stated to be only 12 centimetres ($4\frac{3}{4}$ inches) in total length, and from the drawing of it given in the "Bulletin," its height would appear not to exceed 20 centimetres ($7\frac{1}{8}$ inches). All the parts of the beam are of aluminium or aluminium-bronze, so as to diminish its weight. The pans of the balance are suspended in the ordinary way by steel knife-edges, bearing on rock crystal planes. Its centre of gravity is regulated by the usual screw placed above the axis of suspension of the beam. The principal disadvantage of the beam of a balance being very short, is that its oscillations are necessarily of very small extent, and consequently small differences in weights compared are not so easily observed. To avoid this disadvantageous result, instead of following the movements of the beam by means of the ordinary index-needle and divided arc, M. Mendeleief has fixed to each end of his beam a ring, having stretched across it very fine cobweb threads. Behind the ring is placed a micrometer, M (Fig. 1), divided into tenths of a millimetre. By means of a small telescope the slightest movements of the beam can then be easily followed. With this arrangement it is found that when the balance has one kilogram in each pan, an additional weight of one milligram to either pan causes an inclination of 15 micrometer divisions, so that the error of a kilogram can be thus determined to $\frac{1}{15}$th milligram. This arrangement of telescope and cross-threads is similar to that introduced in Barrow's balance by Prof. W. H. Miller, as used by him for his weighings during the construction of the imperial standard pound, and now belonging to the Standards Department, the comparative shortness of the arms of this balance, about 38 centimetres (15 inches), having led Prof. Miller to employ this method of noting the range of oscillations of the beam. The principal objection to this method is that it requires the observer to stand in close proximity to one side of the balance, so that there is a tendency to the temperature of the beam becoming unequally affected by the greater heat of the observer's body. One division on the micrometer scale of this balance is equivalent to 0.07 milligrams, while in the finest balance hitherto constructed, the kilogram balance, constructed by Œrtling for the comparison of weights of one kilogram, one division is equal to 0.15 milligrams.

Mendeleief's balance is mounted on a column of platinum. Its size is so small that it can be covered by an ordinary bell receiver, which thus allows the weighings to be made in a vacuum without

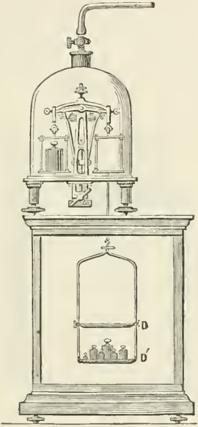
FIG. 1.



the aid of special apparatus. The capacity of the bell receiver required for such a balance, is so small (about 2000 c.c., or 120 cubic inches), that it admits of rapid and easy exhaustion. Thus no automatic arrangement for changing the weights, pans, etc., without opening the balance case appears to be required. An arrangement for putting the beam in motion, or of arresting its oscillation, a little different from that generally adopted, is introduced into this balance. M. Mendeleief finds that by the ordinary construction, which consists of a supporting horizontal arm or cross-piece for releasing the arms of a balance, there is a tendency to lateral displacement of the agate bearings upon the steel knife-edges, with an occasional slipping of the bearings. To prevent this serious fault, M. Mendeleief substitutes for the horizontal arm two levers, L, L (Fig. 1), jointed at the axis, placed in the small column supporting the beam; near the extremity of each of these levers are firmly fixed screws, the conical points of which enter corresponding conical holes in the beam. By this arrangement, all the points of the screws and the bottoms of conical holes continue in contact, without stopping, in all positions of the beam during its oscillations.

Reduced to the dimensions already stated (12 centimetres in length of beam), the balance could not be used in weighing bodies of large volume, as there is no room for them in the small bell cover. It may, however, be used for the purpose of weighing bulky articles by employing an additional apparatus, and placing the balance on top of an ordinary glass balance case, as shown by Fig. 2. From underneath one of the pans of the balance is suspended by a long wire, a double pan, D D′, inside the glass case.

FIG. 2.



Upon the lower pan, D′, is placed a series of weights, from one kilogram to the fraction of a milligram, the beam being counterbalanced by an equal weight placed in the pan suspended inside the bell cover from the other arm. The body of large volume to be weighed is placed in the upper pan, D, and weights are removed from the lower pan, D′, until equilibrium is restored. The weights thus removed represent the weight of the body weighed.

Cones for Bunsen's Filtering Apparatus.—M. H. Cochrane recommends cones of parchment-paper in place of the more expensive platinum cones for the support of the filter; a small filter of parchment-paper is pierced at the bottom with a fine needle, placed in the funnel as usual, and may be applied to almost all purposes to which the platinum cone is applied. Ch. N., July 2d, 1875, p. 8.

A Simple Filtering Pump.—B. C. Buck constructs a filter pump, on the principle of Sprengel's exhaust pump, in the following simple manner: A piece of half-inch caoutchouc tubing, six inches long (Fig. 4), is provided with a one-eighth inch round hole, two inches from the end, by means of a cork-cutter or with a common steel punch. A piece of quarter-inch glass tubing is now shaped as shown in Fig. 5; the pointed end, *a*, is inserted in the hole at *d* (Fig. 4), pressed until its bend is just inside the tube, and the pump is completed. The end (A, Fig. 4) of the caoutchouc tube is stretched over the nozzle of a faucet; a quarter-inch discharge pipe is stretched over the other end (B, Fig. 4). The vacuum produced will of course be proportionate to the height of the column of water supported in the discharge pipe; with a height of four to six feet, passed down the drain pipe which is connected with the sink, very good results may be obtained. The bottle, bell-glass, or test-tube to be exhausted is attached by means of quarter-inch

FIG. 3.

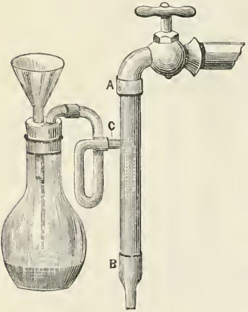
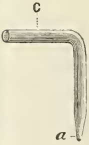


FIG. 4.

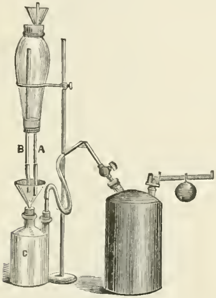
FIG. 5.



tubing at C (Fig. 5). Fig. 3 shows the pump arranged for use. Am. Chem., April, 1876, p. 371.

Apparatus for Rapid and Automatic Filtration.—Thad. M. Stevens recommends an apparatus which, in a cheap way, serves as an excellent substitute for "Bunsen's pump" for hastening filtration. By reference to the woodcut (Fig. 6) the plan of the apparatus will be explained. The steam boiler, which has the capacity of a pint, has an atomizing tube attached to it, by means of which the air is exhausted from the receiver, C. This receiver is surmounted by a funnel, in which the filter is placed, and supported by a platinum cone, as is necessary with Bunsen's pump; or a cone of parchment-paper may be substituted with equally satisfactory results. The automatic portion of the apparatus may be formed of a lamp chimney. It is provided with a long tube, B, for the admission of air, and with a short tube, A, for the discharge of the liquid to be filtered, both passing through a gutta-percha cork; the upper orifice of the lamp chimney is closed with a gutta percha cork, through which a small funnel is fitted for the introduction of the liquid. The tube of this funnel is closed by means of a plug of soft wood or rubber during the process of filtration. Am. Chem., September, 1875, p. 102.

FIG. 6.

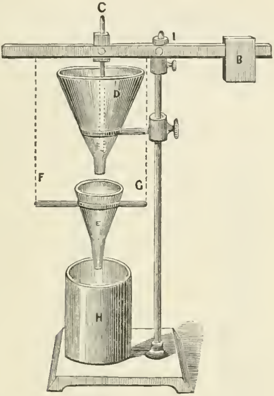


Vacuum Filtration.—The observation that filtration by the aid of "Bunsen's pump" is very much facilitated if the platinum cone does not fit accurately, yet sufficiently close to prevent the filter paper from breaking, has suggested to Walther Hempel to edge upon the inner surface of the funnels to be used for this purpose with a number of fine lines by the action of hydrofluoric acid. The numerous channels thus formed proved, as was expected, to greatly facilitate filtration. The lines are produced by coating the inner surface of the funnel with wax, and drawing, by means of a knife, fine lines up to within 9–12 millimetres of the height the filter is to occupy. The funnel is then filled with strong hydrofluoric acid, and this is allowed to act for two to three hours. Zeitschr. Anal. Ch., Nos. 3 and 4, 1875, p. 308.

Filtration by the Aid of the Siphon.—E. Gregory has used successfully and recommends the following application of the siphon to the ordinary processes of filtration: The piston and cork of a common glass syringe are removed, the barrel of the syringe, at the open end from which the piston was taken, is capped with a piece of filtering-paper, and securely tied with twine; a piece of rubber tubing of proper base and length is then drawn over the nose of the syringe, and the appa atus is ready for use. The syringe, capped end downwards, is introduced into the liquid, the air is carefully exhausted by sucking at the end of the rubber tube, and the liquid will rise through the paper into the tube. The current being once established, filtration continues until the liquid in the reservoir is exhausted, and, since the filtration is upwards and there is no accumulation of sediment, it is quite rapid and constant. There is, of course, considerable danger that the filter-paper will rupture when starting the operation, but with care and a little experience this is soon overcome. The economy in the use of filtering-paper and the many other advantages are self-evident. As to the rapidity of the method, the author appends a number of examples. One pint of vin. ipecac. required twelve hours; the same quantity of spir. lavand. co., two hours and a half; of tinct. benz. co., five hours, etc., etc. The rapidity of filtration, as a matter of course, depends on the size of the syringe used. Can. Ph. Jour., May, 1876, p. 343.

Automatic Balance Filter.—W. H. Seaman has contrived the automatic balance filter illustrated by Fig. 7. This, when carefully constructed, is of considerable practical value for certain purposes, and is constructed as follows: On the upright of any lamp-stand place a slide to which a light wooden bar, A, is pivoted horizontally at I. The stand is furnished with a ring carrying the cone or funnel, D, over the centre of which is a slide pivoted on the bar, A, carrying a glass rod, C, the lower end of which fits and rests in the aperture of the cone, D. Below D the filter, E, is suspended

FIG. 7



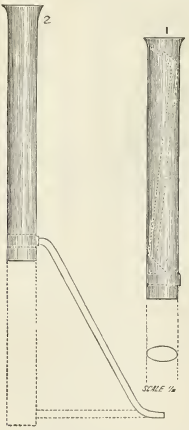
by a wire twist, and the cords, F and G, to the bar, A, which on the other end has a sliding weight, B. For use place B on the bar where it will overbalance the other end of A, and then raise C from the socket in the cone, D, in which the liquid is to be poured, and as soon as a sufficient quantity runs into E its additional weight brings C down and stops the flow until E is nearly empty, when B again raises C, and so on. C is conveniently made by blowing a small bulb on the end of a tube and grinding it to place. The bearings, I and C, should work very freely, and several modifications will readily occur to suit special purposes. Am. Chem., November, 1875, p. 168.

Arrangement of a Filter for the separation of crystalline substances entangled in large amounts of extractive matter. G. Missaghi selects a funnel with a long neck, and puts into it a layer of pieces of porcelain large enough not to enter into the neck; upon this comes a layer of gradually smaller and smaller pieces, so as to sustain a disk of filter-paper, with its edges adhering to the sides of the funnel. Over this is placed fine, pure silica, filling the hollow made by the paper. Over this comes another disk of paper. The funnel is then connected with an aspirator. Ch. N., February 18th, 1876, p. 75; from Gazz. Chim. Italiana, 1875, Nos. 7 and 8.

Filtering-paper.—Ad. Starting has observed recently a lot of filtering-paper which contained among other inorganic impurities a considerable quantity of iron—0.2 grams per sheet. Arch. Ph., April, 1876, p. 338.

Portable Blowpipe.—P. Casamajor has constructed and recommends a blowpipe, which is simple, inexpensive, convenient, and compact, and is represented by Figs. 8 and 9, the latter representing the blowpipe packed for carrying in the pocket, with the

Fig. 8. Fig. 9.



curved jet put away inside of the main tube, while Fig. 8 represents the same tube with the jet in its place when ready for use. The main tube is cylindrical with an elliptical section, as represented in the projection in the lower portion of Fig. 9. The reason for making the section of this tube elliptical instead of circular is that in one direction there is needed a space of half an inch to lodge the curved jet. This would entail the necessity of having a circular tube of half an inch diameter, which would be too bulky. An elliptical tube not only affords a smaller package for the pocket, but it also gives a better mouthpiece, which is even more convenient than one of circular shape. In Fig. 8 is represented the blowpipe as mounted for use; the dotted line represents another blowpipe with a straight jet, so that the characteristics of the new blowpipe may be taken in at a glance. The distance from the mouthpiece to the jet is nearly eight inches, the distance found most favorable by Berzelius. Am. Chem., December, 1875, p. 206.

Charcoal Holder.—P. Casamajor recommends the little instrument illustrated by Figs. 10 and 11 as very convenient for holding

FIG. 10.

FIG. 11.

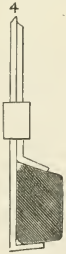
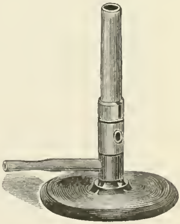


FIG. 12.



the charcoal in blowpipe experiments. It is made by taking two pieces of sheet metal (German silver is the best) about four inches long, and bending the ends as shown in Fig. 10. One bend in each piece forms a jaw for holding the charcoal, as shown in Fig. 11. The other bend is intended for pulling or pushing, so that the jaws may be placed more or less widely apart. After giving each strip of metal its proper shape, they are placed in position and strapped together by two pieces of the same sheet metal; observing that these are not put on too tightly, as a certain freedom must be left to adapt the distance between the jaws to the size of the charcoal. Am. Chem., December, 1875, p. 208.

A Non-retreating Bunsen Burner has been devised by Henry Morton, which consists in constructing a burner of a bore rather large compared with its height, and then drawing its upper edge into the form of an open-ended thimble, so contracting the orifice of escape to about two-thirds the area of the tube. The burner so constructed (see Fig. 12) gives a perfectly non-luminous flame with gas pressures varying between 1.5 and 0.1 inch of water, and with the lowest of these cannot be made to retreat by the most violent handling in the way of sudden movement, or waving about in the air. The low pressure of gas during the daytime (in Hoboken, N. J.) had long given the author trouble from the retreating of the flame in the Bunsen burner of the ordinary construction. These burners are now made by George Wale & Co., of Hoboken. Ch. News, November 26th, 1875, p. 251.

Liebig's Condenser (?).—Prof. Reichardt adduces evidence that the condensing apparatus, familiarly known as "Liebig's Condenser," is neither the invention of Liebig, nor of Höbel, or of Göttling, who are also sometimes credited with its invention, but of Prof. Weigel, of Göttingen, who described it as early as 1771. Göttling himself testifies to this in "Almanach für Scheidekünstler," 1794, p. 129, and Berzelius in the earlier edition of his work on chemistry names the apparatus after Weigel. The condenser should, therefore, hereafter be named Weigel's Condenser.

An Improved Condenser is described by H. Hildebrand, and is claimed to afford a much larger condensing surface than has the form of condenser described in Parrish's "Treatise on Pharmacy," 4th edition, p. 114. The author's paper is accompanied by an illustration of the proposed modification, but the description is too voluminous to find space here. The Pharmacist, March, 1876, p. 68.

English Glass Tubing.—W. C. Parsons had fitted up a small glass apparatus for distilling water, using a piece of two-inch English glass tubing for a condenser. After six or eight months the distilled water obtained was found to contain large quantities of carbonate of lead in solution, and the condenser was found to be incrusted with basic carbonate of lead. This, he considers, was derived from the glass tube, which contained silicate of lead, the latter being decomposed by the combined influence of steam and carbonic acid at an elevated temperature. Ch. N., August 20th, 1875, p. 82.

Drug Mills.—Andrew Blair, who has made experiments in order to determine the relative value of the various drug mills at present found in commerce, reports that the Enterprise Mill is the most satisfactory for general use; next in order for heavy work, the Hance Mill; and for small quantities to be ground fine, the Troemner Mill; the old Swift Mill also answers a good purpose. Proceedings, 1875.

Hair and Bolting-cloth Sieves, which have become torn, are most readily and substantially mended, according to Ad. Starting, by coating both sides of the rend with solution of gutta percha in chloroform. This method is far superior to the application of collodion, court plaster, adhesive plaster, etc., which are more generally used for this purpose. Arch. Ph., April, 1876, p. 338.

Diaetheralysis.—This name is applied to a process which Legrip has successfully used for the expulsion of the juices of fresh vegetable substances by means of ether, and is the result of investigations extending over a considerable period. The vegetable tissue is mechanically divided, and submitted to the direct action of ether in a special apparatus, without the intervention of any exterior reagent. After contact for some time the ether becomes colored intensely green, and below it a dense aqueous layer is formed of a brownish color. The upper ethereal layer contains all the chlorophyll, with the associated fatty matter, whilst the aqueous layer holds in solution all the extractive principles except cellulose. Whether soluble or not, these principles are expelled in the vegetable fluids by presence of the ether, and in the condition in which they circulate in the channels whence they have been chased. The uniform results obtained by the author during his extended investigation lead him to the belief that the process, when applied to vegetable tissues, gathered in the full performance of their functions, removes the active principles without alteration, and leaves only a skeleton, almost devoid of all traces of these principles. The Ch. and Dr., June 15th, 1876, p. 206; from Rép. de Pharm., April 25th, 1876.

Dispensing Poisons.—Walter E. Bibby recommends that the poisons in common use be reduced by trituration with milk sugar, so that eight grains of the trituration shall represent one grain of the poisonous ingredient. By this means greater accuracy in weighing and division is attained than is possible when weighing the pure substance in the ordinary scales of the shops. A. J. Ph., April, 1876, p. 167.

Domestic Measurement of Doses.—Dr. Robert Farquharson draws attention to the inaccuracy in the measurement of doses under the usual direction of drop, teaspoon, tablespoon, wineglassful, etc. After drawing attention to the difference in the number of drops of different liquids to the fluid drachm, which is sufficiently familiar, he gives the capacity of various domestic measures examined by him as follows: A series of seven tablespoons, selected at random, had capacities varying between 5 and 8 drachms; 2 held 6 drachms, 3 held 8 drachms, 1 held $5\frac{1}{2}$, and another held 5 drachms. The dessertspoon was found to vary between 4 and 6 drachms; 4 teaspoons held respectively 80, 90, and 120 minims. In the wineglass the same variation exists, 5 glasses examined having a capacity of $3\frac{1}{4}$, 3, $2\frac{3}{4}$, $2\frac{1}{2}$, and $2\frac{1}{4}$ ounces respectively. The author very properly draws attention to the importance of graduated measures as a substitute for the arbitrary measures usually directed. Ph. J. Trans., March 4th, 1876, p. 708; from British Med. Jour., Feb. 26th, 1876.

Method of Staining Wood Sections for Microscopic Examinations.—Mr. M. H. Stiles communicates the following method, likely to be useful to pharmacists engaged in the study of vegetable histology: Sections of wood usually require bleaching before staining. A weak solution of chlorinated lime—$\frac{1}{4}$ ounce to a pint—forms an excellent bleaching liquid; after removal from this the sections are soaked in a solution of hyposulphite of sodium—ʒj to ℥iv—for an hour, and then washed with water for several hours, changing frequently; previous to being stained they must be placed in rectified spirits for a short time. Anilin red and anilin blue are the colors employed for staining; the red stain consisting of $\frac{1}{2}$ grain of magenta (acetate of rosanilin), dissolved in a fluid ounce of spirit; the blue of $\frac{1}{2}$ grain pure soluble anilin blue, dissolved in one drachm of distilled water, adding 10 minims of dilute nitric acid, and then sufficient spirit to make two ounces. The time required to stain different tissues varies; from 20 to 40 minutes' immersion is usually sufficient, but in all cases the sections should be frequently examined to avoid over-staining. After removing from the dye, the sections are washed several times with spirit, soaked in oil of turpentine for an hour, drained, and immersed in oil of turpentine, changing the latter before mounting. Wood sections presenting varieties of tissue can be stained in two colors, by first treating with magenta, washing with spirit, then soaking in blue dye a few minutes; again washing with spirit, and treating with oil of cajuput and oil of turpentine, as above. In a transverse section of a stem, double-stained in this manner, the vessels, wood-cells, and liber-tissue, will be more or less red; the pith, medullary rays, and cellular tissue of the bark blue or violet. The application of this method had attracted interest in connection with a paper on the stem of Chondodendron tomentosum, by Mr. Moss, referred to elsewhere in this report. Ph. J. Trans., March 18th, 1876, p. 741.

Glaze for Earthenware.—Constantin, an apothecary of Brest, has succeeded in forming a glazing compound for earthenware, which, while free from lead, is durable, and possesses otherwise unexceptional properties. It is composed of 100 p. silicate of sodium, of 50° B.; 15 p. powdered quartz, and 15 p. chalk of Meudon. The addition of 10 p. of borax is a decided improvement (although it increases the expense), as it causes it to melt more readily, imparts a better gloss, and makes the glaze more durable. Ch. C. Bl., No. 23, 1875, p. 366.

ACETA.

Acetum Scillæ, B. Ph.—The vinegar of squill of the British Pharmacopœia is directed to contain a small quantity of proof spirit; added for its preservation. E. Gregory finds that this addition not only results in making the preparation unsightly, but that it also renders it less able to resist the inroads of decomposition. The vinegar should be prepared with dilute acetic acid, and keeps best in situations having an equable temperature, and which are not very strongly exposed to light. Can. Ph. Jour., October, 1875, p. 77.

AQUÆ MEDICATÆ.

Medicated Waters.—G. C. Racher suggests a concentrated solution of the volatile oil in glycerin for the extemporaneous preparation of medicated waters. ʒss. of the volatile oil and ℥ij of pure glycerin are mixed by agitation, and ℥ij of water are then added.

This is diluted to the proper strength, as wanted, and filtered. A. J. Ph., April, 1876, p. 166.

Orange-flower Water.—Vuaflart has observed that orange-flower water which has been distilled by steam has at first a more pleasant odor than that distilled over the direct flame, but that it soon loses its pleasant aroma and even acquires an unpleasant taste, while that distilled over the direct flame retains its properties for years. He attributes this difference to complete extraction of the flowers by direct heat, and their incomplete extraction by steam heat. Machet reports similarly in regard to rose water. Zeitschr. Oest. Ap. Ver., November 12th, 1876, p. 192.

Acqua di Capodieci, a powerful hæmostatic.—Mr. Henry Groves, in reply to the inquiry of a "Puzzled Pharmacist," gives the following information in regard to this hæmostatic liquid, which appears to be the discovery of Dr. Simon Capodieci, of Naples, and has such renown that the Italian government ordered a commission to report thereon. Professor Schiff describes the liquid as one having no action on litmus, and as giving no precipitate with ferrocyanide of potassium; as being clear and without color, but with a slight aromatic taste and smell. It appears that the coagulation which is caused by it resembles that which follows after blood has been left to natural coagulation, in contradistinction to that produced by other hæmostatics, which cause either darkening or other change in the coagulum. Another quality which recommends this liquid is, that it can be taken internally and does not irritate the nervous centres. The odor and taste of the Capodieci water is that of sage or matico, and, as there seems to be a doubt as to whether the efficiency of matico is produced by mechanical or specific means, it would be interesting to make some experiments with a water distilled from the plant, whose virtues may possibly be due to a volatile principle. Ph. J. Trans., November 13th, 1875, p. 382.

W. H. Langbeck considers it probable that the acqua Capodieci referred to by the "Puzzled Pharmacist" may be "Acqua Cappadocea," an old remedy now replaced by Eau de Mélisse des Larmes. The following is the formula: Ol. absinthii, ol. fœniculi, ol. lavandulæ, ol. melissæ, ol. menthæ viridis, ol. rosmarini, ol. rutæ, ol. salviæ, ol. serpylli, ol. thymi, āā. ♏ij; spir. rectificati, ℥j; aquæ destillatæ ad ℥xx. Ph. J. Trans., November 13th, 1875, p. 400.

CATAPLASMATA.

Cataplasms.—Prof. X. Landerer states that cataplasms are almost universally employed in all Oriental countries, and are popularly resorted to as the beginning of the treatment in nearly all complaints. The principal articles used for this purpose are flaxseed and mallow flowers, okra fruit, Corinthian raisins and figs; a mixture of wax and honey is likewise frequently used. The leaves of *Solanum melongena*, called meltsanes, are used in the form of cataplasms against the bites of venomous snakes and scorpions.

Cataplasms are often made with wine, and with wine-must and milk. A very curious cataplasm was used during the visit of the plague for accelerating the suppuration of the buboes; it consisted of a mixture of caviar and flaxseed, and was used with good success in the author's own case, after having been infected by a pestilential cot in the island of Paros, whither he had been sent by the government to assist in arresting this horrible disease. A. J. Ph., May, 1876, p. 196.

Tea Poultice.—Dr. M. Vail had accidentally obtained very happy results with a tea poultice in the treatment of erysipelas, and has since tried it with the same good results in other cases. The poultice is best made with flaxseed meal and a strong decoction of black tea. Dr. Circ., May, 1876, p. 90.

CERATA ET UNGUENTA.

R. Rother recommends oil of mustard seed as an excellent substitute for lard, etc., in cerates and ointments. It appears to have very little disposition to become rancid, and, in the proper proportion, forms ointments of excellent quality and consistence. A mixture of 3 parts of mustard oil, 1 part of spermaceti, and 1 part of yellow wax, is very superior to the officinal simple ointment; or 3½ parts of oil and 1½ of wax may be used to the exclusion of spermaceti. It is used with advantage to substitute olive oil in cerate of subacetate of lead, and resin cerate of superior quality is made with 14 parts of mustard oil, 12 parts of resin, and 4 parts of yellow wax. It also appears to be superior for preparing cantharidal cerate, as it evidently exercises specially favorable solvent action upon the cantharides. Ointments of sulphur, carbonate of lead, and oxide of zinc, retain a smooth grain and the appearance of freshness perfectly, when prepared with mustard oil. The use of mustard oil obviates the necessity of using storax or benzoin for the preservation of ointments. Being non-drying in its character, mustard oil serves an excellent purpose for preparing pomades and hair oils. The Pharmacist, April, 1876, p. 97.

Instead of stirring the melted materials until cool, Mr. H. M. Wilder has tried a method recommended by an old apothecary, which consists in allowing the melted mass to cool down undisturbed, and, when perfectly cold, to gradually work down from the top with a pestle, until the mass is thoroughly mixed. In this way he obtained a much softer ointment than is possible by the process of "constantly stirring until cool." A. J. Ph., May, 1876, p. 215.

Unguentum Aquæ Rosæ.—E. C. Marshall observes in the A. J. Ph. (September, 1875, p. 387), that if an egg-beater is used to stir the ointment while it cools, an ointment is obtained of unexceptionable quality when using the ingredients of the United States Pharmacopœia.

Cold Cream with Borax.—White wax, 1 ounce; oil of almonds, 4 ounces; rose-water, 2 ounces; borax, ½ drachm; oil of rose, 5 drops. Dissolve the wax in the oil by heat, allow to cool somewhat, and while still warm stir into the mixture the borax dissolved in the rose-water. Add the oil of rose, stirring constantly. The mixing should be done in a warm mortar. Dr. Cir., June, 1876, p. 103.

Camphor Ointment.—The following formula is recommended in the "Medical Times," as useful in erythema and in vesicular and squamous affections of the skin: Pulv. camphoræ, gr. xv; glycerinæ, q. s.; axungiæ, ℥j. Dr. Cir., July, 1875, p. 126.

Salicylic Acid Ointment.—Dr. Wagner recommends the following: Dissolve 15 parts of salicylic acid in 30 parts of alcohol, and incorporate with 150 parts of lard. It is important to use alcohol as a solvent, as the direct mixture of the acid with lard does not give the same good effect. Maury, in Rép. de Pharm., October 25th, 1875; Ph. J. Trans., November 13th, 1875, p. 383.

Mercurial Ointment.—Wallet prepares this ointment on "physical principles." Starting from the position that the greater weight of a larger bulk of mercury acts on the side of cohesion, he maintains that the problem to be solved in the preparation of mercurial ointment, is the reduction of this action in favor of cohesion of the weight of mercury in the fat, and claims to have solved the problem by the gradual addition of the metal in quantities of 20 grams when working up 1500 grams with the proper proportion of fat. After each addition of metal the trituration is continued for about one minute, and when the whole of the metal has been thus added, the trituration is continued until the mercury is completely extinguished; about two hours being required for the entire process. Ch. and Drug., July, 1875, p. 217.

Unguent. Hydr. Nitratis.—Joseph S. Whall recommends the substitution of prepared beef-suet for lard. Proceedings, 1875.

J. C. Evans believes that the omission of neats-foot oil in the formula is not an improvement, and that the formula of 1860 is much to be preferred. The temperature given in the Pharmacopœia is too high, and he finds that when the melted fat is not heated above 180° F., before adding the mercurial solution, a satisfactory ointment is obtained. As an improvement on the formula for

Ung. Zinci Oxidi Benz., the author suggests that the oxide of zinc be rubbed to a smooth paste with a small quantity of oil of sweet almonds; a method which, by the way, Julius Kalish suggested in the "American Journal of Pharmacy" several years ago, February, 1873, p. 68; see also Proceedings, 1873.

Ung. Hydrarg. Ox. Rub., he recommends to prepare in a similar manner: 1 ounce of the red oxide being first powdered, well triturated with 2 drachms oil of sweet almonds, and then incorporated with 6 ounces and 6 drachms of benzoated ointment.

Ung. Hydrarg. Ammon. he also prepares in a precisely similar manner; while

Cerat. Plumbi Subacetatis is best prepared by the formula recommended by Mr. A. P. Brown, in A. J. Ph., February, 1873, p. 86. A. J. Ph., September, 1875, pp. 385–6.

Unguentum Plumbi Oxidi of the Pharmacopœia of the Philadelphia Hospital.—Dissolve, with gentle heat, ℥j of lead plaster in f℥ij of olive oil. A. J. Ph., March, 1876, p. 139.

Ung. Plumbi Subacetatis Compositum, Br. Ph.—Balmanno Squire recommends, at the suggestion of his father, Mr. Peter Squire, the substitution of glycerate of subacetate of lead (which see) for liquor plumbi subacetatis, and "vaseline" in place of white wax and oil of almonds. In this manner the ointment is doubly defended from decomposition. Ph. J. Trans., June 17th, 1876, p. 1002.

CHARTÆ.

Charta Arsenicalis Composita of the Philadelphia Hospital Pharmacopœia.—An infusion is made with 96 grains of belladonna leaves, 48 grains of hyoscyamus leaves, 48 grains of stramonium leaves, 4 grains extract of opium, 80 grains of tobacco leaves, and

1 pint of water; in this infusion are dissolved 160 grains of nitrate of potassium, and 320 grains of arsenite of potassium, and with the liquid so obtained, sheets of bibulous paper are saturated, and then dried. A. J. Ph., February, 1876, p. 88.

Fumigating Paper.—H. M. Wilder communicates the following method of preparing a fumigating paper, which gives off its perfume by simply heating, but must not be burned.

Digest 4 ounces of benzoin, 2 ounces each of gum animé and shellac, and 1 ounce of sandarach, in 1 pint of alcohol; filter the solution, and add 12 drachms of balsam of Peru, 2 drachms each of oil of lavender and oil of bergamot, and one-half drachm each of oil of cloves and oil of cassia, dissolved in 4 ounces of alcohol. Sheets of writing-paper are painted with the mixture on one side by means of a flat brush. By previously dipping the paper into a solution of alum and allowing to dry, the reverse of the paper does not show the fumigating tincture. Dr. Cir., June, 1876, p. 103.

COLLODIUM.

Collodion for Freckles (Collodion Antéphélique).—The following is recommended in "Pharm. Zeitschr. Russ." as being effectual:

One grain of finely powdered sulphocarbolate of zinc is incorporated with one gram essence of lemon, 5 grams of alcohol, and 45 grams of collodion. A. J. Ph., February, 1876, p. 67.

CONFECTIONES.

Rachat Lukumia.—Under this name Landerer describes an Oriental sweetmeat, which may be regarded as an expectorant and soothing remedy. The name is of Turkish origin, *rachat*, signifying tranquillity, pleasure, and *lukumia*, something which is easily swallowed. It is prepared as follows:

A syrup is made from 5 lbs. of sugar and 4 lbs. of water; this is clarified with egg albumen, and then mixed with 140 grams of wheat starch or arrowroot, and 3 grams of citric acid, the latter being added to prevent the sugar from crystallizing. This is boiled over a slow fire with continued agitation in the same manner as jujube and marsh-mallow paste, until the mass does not adhere to the fingers, when it is run upon a marble slab, sprinkled with sugar and powdered starch, and cut into squares, which are transparent and soft. This constitutes the simplest of *lukumia;* more complex compounds being prepared by the addition of pistacianuts, chocolate, or almonds, flavoring with rose, lemon, or bergamot, and coloring red, and thus form delicacies, which are well adapted for dessert. After eating a piece a glass of cold water is drank. A. J. Ph., November, 1875, p. 500.

DECOCTA ET INFUSA.

Infusions.—Preservation by means of salicylic acid. F. Baden Benger has made a comprehensive series of experiments upon the preservative action of salicylic acid added to infusions, and finds that when added to these in the proportion of a half grain to the fluid ounce, they will keep unchanged for a long time. The exception among the number experimented with seems to be infusion of senna, which does not keep so well. The acid is added to the warm infusion after straining. Mucilage of acacia and lemon juice may also be protected in this way. Freshly expressed juices of conium, hyoscyamus, and taraxacum, however, do not keep even with the addition of one grain of the acid to the fluid ounce; some becoming mouldy after a few weeks, while others lost their characteristic odor and taste. The author's experiments, furthermore, decide him in favor of concentrated infusion as preferable to fresh infusions.* Ph. J. Trans., September 11th, 1875, p. 210.

Infusum Sennæ Compositum, of the Philadelphia Hospital Pharmacopœia, is prepared by macerating ℥viij of senna, ℥iij of powdered jalap, and ℥ij of bitartrate of potassium, in 6 pints of boiling water for two hours, and adding to the strained liquid 2 pints of compound tincture of senna. A. J. Ph., February, 1876, p. 88.

ELIXIRS.

Elixir of Hops.—The following formula, according to J. B. Moore, furnishes an elixir which, possessing the peculiar aroma and bitterness of the hop, is rendered quite agreeable by aromatic ingredients: Powdered hops (No. 20), 2 oz.; powd. cloves (No. 60), powd. canella (No. 60), of each 1 drachm; powd. cinnamon (No. 60), grains 80; oil of orange (fresh), 2½ fluid drachms; sugar, 12 ounces; alcohol, water, of each a sufficiency. The mixed powders are exhausted by percolating in the usual manner, first with

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* This of course applies to fresh infusions that may have been kept for several days, as is likely to be the case in establishments where infusions are regularly and frequently dispensed.—Rep.

20 fluid ounces of a mixture of 5 parts of alcohol and 6 parts of water, in which the oil of orange has been dissolved, and then with sufficient of a mixture of alcohol and water, of the same strength, until 24 fluid ounces of percolate are obtained. In this the sugar is dissolved, and the elixir is filtered. C. J. Ph., July, 1875, p. 297.

Elixir of Guarana.—G. W. Kennedy recommends the following as furnishing a palatable preparation of guarana: Percolate 4 ozs. of finely powdered guarana with a mixture of 5½ ozs. of alcohol, 4 ozs. of glycerin, and 6 ozs. of water, followed by diluted alcohol, until 15½ fluid ounces of percolate is obtained. To this add 8 drops of oil of orange and 1 drop of oil of cinnamon, previously dissolved in ½ fl. oz. of alcohol, and mix. A. J. Ph., July, 1875, p. 301.

Elixir of Senna.—C. Lewis Diehl recommends the following formula for preparing an elixir of senna from "deodorized fluid extract of senna" (see Fluid Extracts): Deodorized fluid extract of senna, 1 volume; simple elixir (formula of Louisville College of Pharmacy), 3 volumes. He also recommends the preparation of a

Compound Elixir of Senna, by mixing 4 fl. ozs. of deodorized fluid extract of senna; 1 fl. oz. of fluid extract of taraxacum; ½ fl. oz. comp. tinct. cardamom; sufficient simple elixir (as above) to make 16 fl. ozs. The result in either case is a pleasant preparation, free from griping qualities, and quite active. Am. Practitioner, Dec. 1875, p. 328.

Compound Cathartic Elixir.—Powdered Peruvian bark, 2 ozs.; butternut bark (the inner bark of the root, dried and bruised), 2 ozs.; senna, 2 ozs.; dried peppermint, 1 oz.; fennel seed (bruised), 1 oz.; black cherry bark (powdered), 1 oz.; poplar bark (powdered), 1 oz.; pure alcohol of 95 per cent., 1 quart; distilled water, 1½ quart; simple syrup, 1½ pint. Digest for 14 days and strain. Dose: one tablespoonful once a day. Dr. Circ., May, 1876, p. 87.

Elixir of Valerianate of Ammonium.—J. B. Moore recommends the following formula, which has given much satisfaction: Rub 256 grains of valerianate of ammonium with water of ammonia, added drop by drop to exact saturation; then add 12 grains of powdered cochineal and 3 troy ounces of white sugar, and rub this mixture, first with 4 fluid ounces of brandy, and then with 9 fluid ounces of orange-flower water, gradually added. Filter through paper, and pour sufficient orange-flower water through the filter to make the finished preparation measure one pint. Dr. Cir., July, 1875, 122.

ESCHAROTICA.

Caustic Pencils of Sulphate of Copper.—The method of forming these, as recommended by W. Steffen (see "Proceedings," 1875, p. 54), has not succeeded well in the hands of K. Calmberg, who recommends a method communicated by him twelve years ago, and which consists in triturating together in a warm mortar 4 parts of previously powdered sulphate of copper and 1 part of powdered borax. The water of crystallization liberated enables the formation of a plastic mass, which may then be formed into cylinders of required size and shape. Owing to the rapidity with which the mass hardens, it is necessary to work rapidly; otherwise the addition of a few drops of water will reimpart the proper consistence. Arch. Ph., Aug., 1875, p. 133.

Schoull reduces the crystals of sulphate of copper to a coarse powder, heats this to a temperature of 150° C. (= 302° F.) until it has lost nearly all its water of crystallization; reduces it to a fine powder, and then adds the water it has lost in small quantities. By the aid of a pestle a mass of pilular consistence is formed, which is readily rolled into cylindrical pieces of suitable thickness. If the mass should accidentally become too soft, a little finely-powdered dried sulphate of copper will impart the necessary consistence. A. J. Ph., Feb. 1876, p. 67; from L'Union Pharm., 1875, p. 326.

Cautery of Nitrate of Zinc.—Crystallized nitrate of zinc has been recommended as a cautery. It is treated similarly to sulphate of copper, by melting it in its water of crystallization. A caustic paste is prepared from 100 parts of nitrate of zinc, 50 parts of water, and 50 of flour; if this paste be wanted in the form of sticks, it is necessary to dry them with as little heat as possible, else they become very brittle. A. J. Ph., Dec. 1875, p. 536; from N. Y. Pharm. Tid., 1875, p. 325.

EXTRACTA.

Extract of Belladonna.—Joseph Le Roy Webber has made some interesting examinations of commercial extracts of belladonna, from which it appears that the American extracts contain more atropia than those of foreign manufacture, and that the alcoholic extracts are very decidedly stronger than the aqueous extracts or the inspissated juices. The atropia determination was made by reducing the extract to a thin syrupy consistence with water, exhausting this with alcohol, agitating the united alcoholic solutions with hydrate of calcium, filtering after twelve hours, washing the residue on filter with alcohol, adding to the filtrate and washings dilute sulphuric acid to acid reaction, again filtering to remove sulphate of calcium, concentrating the filtrate, and dissolving the impure sulphate of atropia in water (100 c.c. for 10 grams extract). The atropia was now determined by Mayer's method, the volumetric solution of iodohydrargyrate of potassium being made by dissolving 13,546 grams of corrosive sublimate and 49.8 grams of iodide of potassium in sufficient water to make 1 litre, and representing for 1 c.c., 0.0145 gram of atropia. The following table exhibits the author's results:

Extract.	Test solution required for 100 c.c. of extract solution.	Indicating Atropia.	Percentage of Atropia in extract.
U. S P., ...	17.732	0.2571	2.571
Lazell, Marsh & Gardiner, . .	17 330	0.2511	2.511
Park, Davis & Co., ...	16.264	0.2358	2.358
Burrough Bros., ...	16.264	0 2358	2.358
Henry Thayer & Co., ...	12.666	0.1836	1.836
Tilden & Co., ...	12.400	0.1798	1.798
Charles Ellis, Son & Co., . . .	12.133	0.1759	1.759
McKesson & Robbins, ...	11.710	0.1697	1.697
E. Merck (alcoholic extract), . .	10 260	0.1488	1.488
George Allen & Co., ...	9.730	0 1411	1.411
Herrings & Co., ...	8.133	0.1179	1.179
Mt. Lebanon, N. Y. (insp. juice, 6 years old), ...	6.240	0.0904	0.904
E. Merck (aqueous extract, made 1869), ...	1.900	0.0275	0.275

A. J. Ph., April, 1876, p. 145.

Extract. Hyoscyami.—E. Heintz obtained from 15,000 parts of fresh hyoscyamus 375 parts of extract by the process of the Pharm. Germ. The press residue amounts to 8000 parts, but was by no means quite exhausted, since 2000 parts, when infused in fresh water, strained, evaporated, and treated with alcohol as prescribed by the Pharmacopœia, yielded 35 parts of extract of good quality, as evidenced by its odor and the reactions for hyoscyamia by Stass's method. Arch. Ph., April, 1876, p. 323.

Extract of Jalap, U. S. P.—G. H. Charles Klie criticizes the officinal process for the preparation of extract of jalap, objecting mainly to the indefinite character of the directions "introduce into a percolator." If the fine powder is packed firmly into the percolator the alcohol will pass through and exhaust the drug very readily; but the water, with which it is subsequently to be exhausted, will pass so very slow, owing to the large amount of extractive taken up, that the completion of the process is very much delayed. He has found that the following method affords a very satisfactory extract, and may be rapidly concluded. It consists in exhausting the *whole root* by repeatedly macerating the root in water, the root being suspended on a perforated diaphragm, and the water drawn off as it becomes saturated. When exhausted, the root is superficially dried, pounded into a fine mass, packed moderately firm into a percolator, and displaced with alcohol, of which about four pints will be necessary for one pound of root. The yield obtained by the author by this method was 56 per cent., while by the officinal method he obtained but 54 per cent. The author also draws attention to the economy resulting to pharmacists preparing this extract. A. J. Ph., June, 1876, p. 262.

Professor Maisch, in connection with the above paper, draws attention to the necessity of modifying the officinal process on the occasion of the next revision of the Pharmacopœia, since it seems generally to be conceded that the aqueous extract of jalap, obtained after the exhaustion of the root by alcohol, is inert as regards purgative effect, and its incorporation with the alcoholic extract seems, therefore, of doubtful propriety. Ibid., p. 265.

Extract of Seneka.—C. Schneider has obtained by the process of the Ph. Germ. (extraction with diluted alcohol by two macerations and evaporation to dryness), 31.475 per cent. on one and 33.33 per cent. on another occasion. By the process the medium thick roots and the root-heads are nearly completely deprived of their senegin, while the fibrils and thick roots are completely exhausted. He appends to his paper on "Radix Senegæ" (see Seneka in this report) the yields obtained by others, as follows: In 1834, by Redtel, 31.250 per cent.; in 1834, by Koch, 22.916 per cent.; in 1873, by Hager, 22.0 and 24.0 per cent.; in 1872, by Hirsch, 28.5 per cent.; in 1873, by Werner, 25.0 per cent. Arch. Pharm., November, 1875, pp. 410, 411.

Extract of Malt.—In view of the fact that extract of malt is coming into more general use, Dr. Hager draws attention to its liability to adulteration—chiefly with glucose—and regards the following points, which enable an approximation of its quality:

1. The peculiar sweetish taste, and the agreeable odor of fresh-baked bread.

2. The faint turbidity when dissolved in water. When 5.0 of the extract is dissolved in 45.0 of distilled water, without heat, a faint turbid solution is obtained, which may be readily filtered.

3. When 10 c.c. of this filtered solution is mixed with an equal volume of cold saturated solution of picric acid, in a test-tube 1.5 centimetre in diameter, the mixture becomes turbid, and the turbidity increases until in ten minutes it is perfectly opaque when held between the eye and light. This opacity is due to the protein substances present, which may be determined quantitatively by digesting 10.0 of the extract with 100.0 solution of picric acid, at a moderate temperature, for half an hour, allowing the sediment to subside in a cool place, collecting this on a filter, washing, and drying on a water-bath. One-half of the weight of this represents the protein bodies.

4. The same filtered 10 per cent. solution of the extract, when shaken with tincture of galls in excess, affords a strong, perfectly opaque, whitish turbidity. Ph. Centralhalle, No. 23, 1876, p. 193.

Hager gives the following methods of medicating extract of malt:

Ext. Malti Chiniatum.—1.0 sulphate of quinia is dissolved in 250.0 extract of malt. The bitter taste of this preparation is overcome by substituting tannate of quinia (prepared by Rozsnyay's method—see Proceedings, 1875) for the sulphate, and thus forming

Ext. Malti Tannochiniatum.—1.0 tannate of quinia to 100.0 extract of malt. With a perfectly neutral extract of malt (prepared by Riedel) a solution was obtained by the author, in which no deposit had formed after standing eight days.

Ext. Malti Ferratum.—The preparation of the Ph. Germ. is made with pyrophosphate of iron. Hager suggests advantages in substituting the soluble oxide of iron of that standard for the pyrophosphate. 3 parts saccharate of iron are triturated with 7 parts of glycerin, and the mixture is incorporated with 90 parts of neutral extract of malt.

Ext. Malti Iodatum.—0.01 iodide of potassium is dissolved in 100.0 extract of malt.

Ext. Malti Pepsinatum.—A preparation containing pepsin and malt seems desirable. Hager recommends that 2 parts of pepsin (composed of equal parts of pepsin and milk-sugar) be triturated with 5 parts of glycerin, and the mixture incorporated with 93 parts of extract of malt. Ph. Centralhalle, June 15th, 1876, p. 201.

EXTRACTA FLUIDA.

Henry C. Schrank estimates the alkaloids in certain fluid extracts by means of iodo-hydrargyrate of potassium. The method consists in evaporating a certain measure of the fluid extract to a syrupy consistence, acidulating with sulphuric acid, adding water, filtering off precipitated matter, and bringing the filtrate to two or three times the original bulk. If very dark-colored, the aqueous solution is first treated with acetate of lead, the excess of lead removed by sulph-hydric acid, the filtrate evaporated, etc. The clear solution is then titrated with solution of iodo-hydrargyrate of potassium, as originally suggested by Professor F. F. Mayer, the volume of which consumed, permits the easy calculation of the quantity of alkaloid contained in the volume of fluid extract used. In this manner the author determines the percentage of alkaloids in the fluid extracts of nux vomica, belladonna, conium, hyoscyamus, stramonium, and veratrum viride. A. J. Ph., June, 1876, p. 250.

Deposits in Fluid Extracts. Cinchona, Ergot, Hyoscyamus.—C. S. Johnson has examined deposits which had formed from fluid extracts, which had been stored perfectly clear in a cool cellar for two or three weeks. The deposits were first washed on the filter with cold water until the washings were tasteless and colorless.

The deposit from fluid extract of cinchona was found to consist, to the amount of about two-thirds, of cellular matter; it contained both cinchotannic and kinic acids, about 2½ per cent. of alkaloids, and the rest was rich in potassium compounds.

The deposit from fluid extract of ergot contained much oily matter, and left, on treatment with ether, a mixture of amorphous and cellular matter. No definite results as to alkaloids or other active constituents were obtained.

The deposit from fluid extract of hyoscyamus had the appearance of soft tar, and a strong odor of hyoscyamus. A considerable portion of empyreumatic oil was obtained by distillation from the water-bath, but scarcely any cellular matter was evidenced under the microscope, and while rich in nitrate of potassium, it contained no alkaloid. A. J. Ph., November, 1875, p. 483.

Fluid Extract of Cotton-root Bark.—The observation of Prof. Maisch, that cotton-root bark is sometimes substituted by the bark of another root (probably of the cottonwood tree) (see Proceedings, 1875), has induced J. U. Lloyd to inquire into the nature of the difference observed in the character of the fluid extracts of gossypium of commerce. He finds that when the fluid extract is prepared from a bark collected at the proper time, it is a brownish-yellow liquid. This, however, on keeping changes gradually to a beautiful bright-red color, acquires decided acid reaction, and generally forms a copious curdy deposit, although the latter does not occur in all instances. This change from brownish-yellow to red is so characteristic of cotton-root bark that it readily serves to indicate the source when doubt exists as to the nature of the bark used in a fluid extract. Fluid extract of geranium might be mistaken for that of gossypium, as its color is deep red, and it forms a similar deposit. But the red color in the case of geranium is characteristic of the recently prepared fluid extract, while its very marked astringency renders a mistake of identity improbable. From inquiry made of Messrs. Wallace Brothers, of Statesville, N. C., it appears that the bark is properly collected in October, immediately after the cotton harvest, and before the wet weather sets in; for at this time it acquires a deep-brown color, and becomes unfit for use. When collected at the proper time, and of prime quality, cotton-root bark is yellowish-brown externally, internally much lighter (sometimes nearly white), has a sweetish astringent taste, and forms, as before stated, a brownish-yellow fluid extract by the process of the Pharmacopœia. A. J. Ph., July, 1875, p. 289.

Fluid Extract of Canada Snake-root.—A. H. Van Gorder recommends its preparation according to the directions given by Parrish in his second class (group?) of fluid extracts. A. J. Ph., April, 1876, p. 156.

Fluid Extract of Wild Cherry Bark.—Isaac W. Smith recommends a modified formula for the preparation of this fluid extract, which necessitates the use of sweet almonds, and seems to require altogether too much time and attention to be regarded an improvement on the officinal process. See A. J. Ph., May, 1876, p. 215.

Deodorized Fluid Extract of Senna.—C. Lewis Diehl recommends the following formula for preparing a fluid extract of senna leaves, which are in the process deprived of their odorous and resinous, and consequently their griping constituents, without materially impairing their purgative action. Take of Tinnevelly senna, 16 troy ounces; stronger alcohol, glycerin, and water, of each a sufficiency; macerate the leaves in 4 pints of stronger alcohol for two days, and express; add to the expressed leaves 2 pints more of stronger alcohol, and again express; then dry and reduce them to a fine powder. According to the general directions for preparing the officinal fluid extracts, percolate this powder first with a mixture of 6 fluid ounces of stronger alcohol, 2 fluid ounces of glycerin, and 8 fluid ounces of water, and then with a sufficiency of a mixture of 6 measures of stronger alcohol and 10 measures of water, till 32 fluid ounces of percolate have passed. Of this, the first 12 fluid ounces are set aside; the remainder of the percolate is evaporated to 3 fluid ounces, and, together with 1 fluid ounce of stronger alcohol, added to the reserved portion; after standing several days decant the clear liquid, or filter. Formulas are given for preparing a simple and a compound elixir of senna with this fluid extract (see Elixirs). Am. Practitioner, December, 1875, p. 327.

GLYCERITA.

Glycerita Olei Ricini, of the Philadelphia Hospital Pharmacopœia, is prepared by incorporating 24 drops of oil of cinnamon and 4 fluid ounces each of glycerin and castor oil. A. J. Ph., February, 1876, p. 88.

Glycerol of Tar.—Ch. Peyronnet obtains a perfectly homogeneous preparation, of the consistence of ointment, by operating as follows: 5 grams of starch are well mixed with the same quantity of water; 30 grams of glycerin are added, and the mixture is heated, with constant agitation, until it has acquired the proper consistence, when 10 grams of purified tar are added and well mixed. A. J. Ph., February, 1876, p. 66; from L'Union Pharm., 1875, p. 324.

Glycerole of Subacetate of Lead.—Balmanno Squire proposes a glycerole of subacetate of lead, which is prepared by heating in the Pharmacopœia proportions acetate and oxide of lead with glycerin instead of water, and using an oil-bath as the source of heat, taking care not to reach the boiling-point of the glycerin. The solution has greater viscidity than pure glycerin, and cannot, therefore, be readily filtered at the ordinary temperature, and this process must, therefore, also be conducted at an elevated temperature (a steam-bath). This preparation, diluted with three to seven times its bulk of glycerin, is not only an excellent substitute for the ordinary lead-water, but permits also of more extended application than is the case with the aqueous preparation. Ph. J. Trans., May 6th, 1876, p. 881.

C. D. Parry submits a much easier method of making the glycerole of subacetate of lead above suggested, which consists in mixing equal portions of liq. plumbi and glycerin in an open dish, and evaporating the mixture by gentle heat until the water is driven off. When the glycerin is reduced to its original volume it may be poured into a bottle, filtering not being necessary. Ibid., May 27th, 1876, p. 942.

Glycerole of Meat.—A true solution of the constituents of meat, which any pharmacist can readily prepare without any expensive or cumbersome apparatus, may be obtained, according to Louis G. Volkmar, as follows:

Take of fresh beef, 2 lbs. avoir. (round steak cut fine and free from fat); water, q. s.; sherry wine, 2 ounces; glycerin, 4 fluid ounces; salicylic acid, 2 grains; oil of caraway, 3 drops. Place the meat with 8 ounces of water and 3 ounces of glycerin into a wide-mouthed bottle, heat gently by means of steam not exceeding 128° F. In order to keep the preparation at a uniform temperature, the author has had a tin vessel constructed, being twice the height of the bottle used, with a width at the top an inch larger than the diameter of the bottle. Two pieces of wire soldered crosswise at the centre of the vessel will retain the bottle at its proper place. A small quantity of water is placed into the vessel and heat applied; the steam arising from the water passes around the bottle and keeps it at the proper temperature. A thermometer should be kept in the bottle to guard against overheating. The mixture being stirred occasionally for four hours, it is then thrown upon a muslin strainer, the liquid well expressed, and filtered. The residue is boiled for half an hour with 12 ounces of water in an open vessel, then expressed, and the liquid filtered. The two filtrates are mixed, brought to the measure of 24 ounces, and the remaining ingredients added. The finished preparation contains all the nutriment of meat; the temperature not being high enough to coagulate the albuminous matter, it is all dissolved and contained in the preparation; by the boiling in the second manipulation the other soluble constituents of the meat are more fully extracted. The preparation should be kept on ice. Dr. Cir., November, 1875, p. 186.

LINIMENTA.

Linimentum Terebinthinæ Aceticum, B. P.—W. H. Symons recommends the following modification of the officinal formula for this liniment: Oil of turpentine, liniment of camphor, of each, 4 fluid ounces; glacial acetic acid (solid at 60° F.), 1 fluid ounce. Such a liniment, while containing the quantity of acetic acid of the Pharmacopœia, contains both turpentine and camphor liniment in larger quantities (all water being excluded), and furnishes a perfectly clear mixture which is miscible with liquids of an oily nature. If it is desirable to prepare a liniment that is miscible with spirit, the following modification will answer:

Camphor, 240 grains; oil of turpentine, 2 fluid ounces; dissolve, and filter if necessary, then add, castor oil, 2 fluid ounces; glacial acetic acid (solid at 60° F.) 4 fluid drachms. Either of the liniments remain transparent considerably below the freezing-point. The last-named mixes with spirit in the proportion of 1 to 7, and with oils in any proportion. Ph. J. Trans., October 16th, 1875, p. 301.

Linimentum Terebinthinæ Compositum, of the Philadelphia Hospital Pharmacopœia, is made as follows: Oil of turpentine, stronger water of ammonia, of each, f℥j; soap liniment, f℥iv. Mix. A. J. Ph., March, 1876, p. 137.

Linimentum Chloroformi Compositum, of the Philadelphia Hospital Pharmacopœia, is prepared by mixing together f℥ij chloroform, f℥ss. tincture of aconite root, f℥ss. ammonia-water, and f℥v olive oil. The

Linimentum Saponis Viridis, officinal in the same hospital, is prepared by dissolving ℥j of green soap, by the aid of gentle heat, in sufficient alcohol, and filtering the solution. A. J. Ph., February, 1876, p. 88.

LIQUORES.

Hypodermic Solutions.—Preservation by salicylic acid. S. Limousin has observed that a solution of 0.20 grams of hydrochlorate of morphia in 10 grams of distilled water was spoiled in three weeks with the separation of numerous crystals and slimy flocks, while a solution of the same strength remained clear and limpid after the addition of two centigrams of salicylic acid, which the author regards as superior to the various agents previously recommended for the same purpose. A. J. Ph., May, 1876, p. 217; from Rép. de Pharm., 1876, 65.

Blistering Liquid (Liq. Epispasticus, B. P.).—Mr. James Deane advocates the substitution of acetic ether for acetic acid and ether in the formula of the British Pharmacopœia. This formula directs 8 ozs. of powdered cantharides to be moistened with 4 fl. ozs. of acetic acid, and to be then percolated with sufficient ether till 20 fl. ozs. of finished liquid are obtained. Prepared in this manner, the author obtained from 2 fl. ozs. of the liquor 37.8 grains of extractive, which was entirely soluble in chloroform, and yielded 0.8 grains of cantharidin. By using glacial acetic acid instead of ordinary acetic acid, as recommended by Tichborne, the same quantity of liquor yielded 43.3 grains of extractive and 1.8 grain cantharidin. When using acetic ether alone, 2 fluid ounces yielded 47.5 grains of extractive and 2.2 grains cantharidin; while the residue in the percolator retained so little cantharidin, that from 2 fluid ounces of expressed liquid, only traces of cantharidin could be obtained. The same quantity of pressings from the residue of the officinal preparation, and from Tichborne's modification, yielded respectively 0.7 and 0.8 grains. Ph. J. Trans., Feb. 5th, 1876, p. 621.

Liquor Gutta-Perchæ.—George E. Willmarth recommends its preparation from purified gutta-percha, obtained by a method which will be found under the head of "Gutta-percha" in this report. Forty-two grains of purified gutta-percha in slices are dissolved in one fluid ounce of chloroform, contained in the glass-stoppered bottle in which it is to be kept. The bottle must be perfectly dry, for if alcohol is present a milky solution is formed. A. J. Pharm., Oct. 1875, 1876, p. 456.

Liquor Chloroformi Comp.—*Chlorodyne.*—J. F. Hancock recommends the formula of P. Squire (see Proceedings, 1874, p. 338), and that it be prescribed under the name of "Liquor Chloroformi Compositum."

Chlorodyne of the Philadelphia Hospital Pharmacopœia: ℞. Chloroform, f℥ss.; spirit of ether, fʒiss.; oil of peppermint, gtt. viij; oleoresin of capsicum, gtt. ij; extract of Indian hemp, gr. vj; muriate of morphia, gr. xvj; diluted hydrocyanic acid, ♏ lxv; diluted hydrochloric acid, fʒj; glycerin, water, of each sufficient to make f℥iv. Dose, 15 to 20 drops. A. J. Ph., March, 1876, p. 138.

Solution of Salicylic Acid.—Muller recommends the following formula for a solution of salicylic acid: 1 grain salicylic acid, 20 grains glycerin, 80 grains distilled water. The acid to be dissolved in the glycerin, and the water added. Maury, in Rép. de Pharm., Oct. 25th, 1875; Ph. J. Trans., Nov. 13th, 1875, p. 383.

Prof. Emlen Painter proposes the following formula, whereby two grains of salicylic acid can be given in a teaspoonful of solution. Dissolve 32 grains of salicylic acid in 2 fluid ounces of solution of acetate of ammonium. The solution is not unpleasant to take, having the sweetish taste of the acid, while the acetate of ammonium is likewise indicated in most cases where salicylic acid is prescribed for internal use. A. J. Ph., June, 1876, p. 277; from Pacific. Med. and Surg. Jour., April, 1876.

Solution of Citrate of Magnesium.—A clear and bright solution of citrate of magnesium is obtained, according to A. G. Schlotterbeck, if the solution of carbonate of magnesium in citric acid and water is, after the addition of the lemon syrup, filtered, and a filtered solution of the bicarbonate of potassium is added previous to corking the bottles; allowance being made for the water necessary to effect the solution of bicarbonate of potassium. A. J. Ph., Nov. 1875, p. 501.

The variability of results observed by different operators is attributed by L. C. Hogan to the quality of the commercial carbonate of magnesium. With carbonate of magnesium of good quality a solution of uniform stability and good quality will be obtained when the officinal process is followed. Of all the specimens of English carbonate examined by the author, but one was practically free from aluminium, calcium, and iron; all others containing these in comparatively large quantities. The Pharmacist, Oct. 1875, p. 292.

Effervescing Solution of Tartrate of Sodium.—Henry T. Hayhurst recommends an effervescing solution of tartrate of sodium prepared as follows: ʒx of carbonate of sodium are reduced to powder, intimately triturated with gtt. iij of oil of lemon, and dissolved in water; ʒv of crystals of tartaric acid are now added, and, when solution is effected, filtered into a 12-ounce bottle, and the preparation is finished by the addition of f℥iss. of syrup, sufficient water to make f℥xij of finished preparation, and ʒj of tartaric acid; the cork being immediately inserted and tied to preserve the carbonic acid. The author prefers the crystallized acid mainly on account of its greater purity than the commercial powdered acid. The carbonate of sodium should be purified by recrystallization. A. J. Ph., May, 1876, p. 207.

Liq. Ammon. Acet., B. P.—J. C. Thresh finds this preparation to be frequently carelessly prepared, and of variable strength. He attributes this partly to the variable strength of the acetic acid of British commerce, which, he states, is often 10 to 20 per cent. weaker than the British Pharmacopœia standard. Nearly all the samples examined were distinctly alkaline, from which it seems that few appear to take the trouble of heating the solution previous to ascertaining that the fluid is neutral. Ph. J. Trans., April 1st, 1876, p. 781.

Liquor Bromini, of the Philadelphia Hospital Pharmacopœia, is made by dissolving ℥j bromine in f℥ij water, by the aid of sufficient bromide of potassium.

Liquor Plumbi Subacetatis cum Opii, adopted in the same hospital, is made by mixing f℥ij of tincture of opium with Oij of diluted solution of subacetate of lead. A. J. Ph., March, 1876, p. 137.

MISTURÆ.

Mistura Glycyrrhizæ Composita.—Walter E. Bibby suggests that the sugar, gum arabic, and licorice, directed in the officinal formula, be substituted respectively by corresponding quantities of syrup, mucilage of gum arabic, and solution of extract of licorice; the latter being made by dissolving the extract in water, and of such strength that one ounce of the extract shall be represented by two fluid ounces of the solution. A. J. Ph., August, 1875, p. 340.

William Arthur proposes as a substitute for extract of licorice in the officinal formula, *glycyrrhizate of ammonium* (which see). Glycyrrhizate of ammonium, 120 grains; dissolve this in 12 fluid ounces of water, add 20 minims of water of ammonia, and in this solution dissolve 240 grains each of sugar and powdered gum arabic; add to this solution 2 fluid ounces of camphorated tincture of opium, 1 fluid ounce of wine of antimony, and 4 fluid drachms of spirit of nitrous ether. The preparation is of a deep amber color, contains as full a proportion of the sweet principles of licorice as the officinal mixture, and is devoid of all grit, starch, etc. Dr. Circ., January, 1876, p. 23.

A. F. W. Neynaber obtains a very satisfactory mixture by extracting the extract of licorice, cut in slices about one-fourth inch thick and placed upon cotton or linen in a percolator, by the water, and then adding the other ingredients. Ibid., February, 1876, p. 39.

Mixture of Gum Arabic.—Allen Shryock proposes, for convenience in dispensing, a mixture composed of ℥iv gum arabic and sufficient warm glycerin to make f℥viij. Such a mixture saves much time and insures thorough admixture without the use of the mortar or pestle. In precisely the same manner the author prepares a *mixture of extract of licorice.* A. J. Ph., November, 1875, p. 496.

Mucilage of Gum Arabic.—Preservation.—David Preston proposes a solution of gum arabic of one-half the pharmacopœial strength, which he preserves by using one-fourth of the water necessary in form of a saturated solution of salicylic acid. A. J. Ph., November, 1875, p. 495.

A very strong mucilage is said to be obtained by adding to $8\frac{1}{3}$ fluid ounces of mucilage of gum arabic, a solution of 30 grains of sulphate of aluminum in $\frac{2}{3}$ of an ounce of water. The mucilage is suitable for wood, glass, or porcelain. The Pharmacist, January, 1876, p. 6; from Jour. de Pharm.

Phosphorus Mixture.—Dr. Méhu has devoted considerable attention to the different modes of administering phosphorus, and gives it as his opinion that the best pharmaceutical form for its administration is as solution in oil, which is preferably given in capsules containing one milligram, but may also be given in the following mixture:

Take of phosphorated oil (1 per cent.), 0.10 grams; syrup of gum, 30.00 grams; distilled peppermint water, 30.00 grams. Pour the syrup of gum into a bottle of 60 grams capacity, and by slightly shaking cause it to moisten the entire interior of the bottle. Introduce the phosphorated oil, shake well and pour in the peppermint-water. The bottle should be shaken before administering the dose, to render the emulsion more homogeneous. The

Phosphorated Oil is prepared as follows: Pure oil of sweet almonds, slightly colored, limpid, free from admixture with oil from plum and peach kernels, is heated in a porcelain capsule to a temperature of from 200° to 250° C. (= 392° to 482° F.), whereby good oil is decolorized, and is then allowed to cool partially, and filter while still hot through paper. A ground stoppered flask is filled to nine-tenths of its capacity with the oil, 1 per cent. of perfectly clear and dry phosphorus is added, the flask is placed up to its neck into boiling water, when sufficiently warm is closed, and after the temperature of the oil has risen to about 70° or 80° C. (= 158° to 176° F.), the bottle is well agitated until the phosphorus is completely dissolved. The oil is capable of dissolving about one-eightieth of its weight of phosphorus, but the author prefers the definite quantity above indicated. The oxidation of the oil is prevented by pouring a few drops of ether upon the stopper at the moment of opening the bottle. Ph. J. Trans., July 3d, 1875, p. 2; from Rép. de Ph., vol. iii, p. 321.

The following mixtures are officinals of the Pharmacopœia of the Philadelphia Hospital:

Mistura Antirheumatica.—℞. Nitrate of potassium, ʒj; wine of colchicum root, fʒj; sweet spirit of nitre, f℥j; syrup of guaiacum (see Syrups), f℥ij; oil of wintergreen, gtt. vj; water, sufficient to make f℥vj. Dose, a tablespoonful every two hours.

Mistura Arsenicalis Composita.—℞. Solution of chloride of arsenic, fʒss.; tincture of chloride of iron, f℥iss.; sulphate of cinchonia, ʒij; sulphate of strychnia, gr. ij; syrup, water, of each sufficient to make f℥vj. Dose, a teaspoonful.

Mistura Astringens.—℞. Aromatic sulphuric acid, fʒij; extract of logwood, ʒij; camphorated tincture of opium, f℥ss.; syrup of ginger, to make f℥vj. Dose, a tablespoonful.

Mistura Cosmetica (Goddard's Cosmetic Lotion).—℞. Tincture of benzoin, fʒij; corrosive chloride of mercury, gr. vj; rose water, f℥vj.

Mistura Cretæ Composita.—℞. Tincture of catechu, camphorated tincture of opium, of each fʒvj; carbolic acid, gtt. xij; chalk mixture, to make f℥vj. Dose, a tablespoonful.

Mistura Ferri Chloridi Composita.—℞. Solution of acetate of ammonium, f℥iij; tincture of chloride of iron, fʒijss.; diluted acetic acid, fʒj; curacoa or alcohol, fʒij; syrup, water, of each sufficient to make f℥vj. Dose, a tablespoonful.

Mistura Ferri cum Quinia.—℞. Sulphate of quinia, ʒj; diluted phosphoric acid, a sufficiency; pyrophosphate of iron, ℥ss.; aromatic mixture (?) to make f℥xxx. Dose, a tablespoonful.

Mistura Sodæ (Soda Mint).—℞. Bicarbonate of sodium, ʒij; aromatic spirit of ammonia, gtt. xxxvj; spearmint water, f℥viij. Dose, one or two tablespoonfuls.

Mistura Sodæ Composita.—℞. Bicarbonate of sodium, ʒij; creasote, gtt. xij; syrup of gum arabic, f℥ij; compound spirit of lavender, f℥iss.; water, to make f℥vj. Dose, a tablespoonful two hours after meals.

Mistura Zollickofferi.—℞. Iodide of potassium, powdered guaiacum resin, of each, ʒijss.; wine of colchicum-root, f℥iss.; cinnamon-water, syrup, of each sufficient to make Oj. Dose, a tablespoonful. A. J. Ph., March, 1876, p. 138.

Salicylic Acid Mixture.—Professor Wunderlich recommends the following mixture to be used as a gargle when salicylic acid is to be administered in that form to children: Salicylic acid, 1 gram; oil of sweet almonds, 20 grams; gum arabic, 10 grams; syrup of almonds, 25 grams; orange-flower water, 45 grams. A teaspoonful to be used every hour.

Another formula is suggested by Maury: Salicylic acid, 1.50 gram; gum arabic, 10 grams; sugar, 10 grams; orange-flower water, 20 grams; distilled water, 100 grams. A teaspoonful is a dose for children, the vial to be shaken before each dose. Maury, in Rép. de Pharm., October 25th, 1875; Ph. J. Trans., November 13th, 1875, p. 383.

Emulsifier.—Charles F. Hartwig describes a contrivance by which the preparation of emulsions is very much simplified. The emulsifier is constructed of a common wide-mouthed bottle and an ordinary female syringe, as shown in the cut (Fig. 13), and is used as follows: Equal parts of mucilage (of gum arabic?) and water are placed into the bottle, and these are thoroughly mixed by raising and lowering the plunger several times; the requisite quantity of oil is then added, and the plunger is then worked until a homogeneous mixture is obtained, to which the remaining ingredients are then added. The glass syringe might advantageously be substituted by a similar instrument having a flat instead of convex bottom. The ordinary cotton packing in the plunger is substituted by rubber or cork. The apparatus is very readily cleansed? The Pharmacist, October, 1876, p. 289.

Fig. 13.

Hugo W. Martin has given the contrivance of Mr. Hartwig a very thorough trial, and finds that it does not emulsify as perfectly as can be done with the mortar and pestle. He thinks, however, that the apparatus may be improved by substituting a bottle that tapers towards the bottom, like a graduating measure, for the ordinary shaped bottle, and a hard rubber syringe for one of glass. Of the various other methods of manipulating when making emulsions the author gives the preference to that of triturating the oil and gum together, and then adding the water. This always affords a perfect emulsion, whilst the troublesome lumping of the gum, experienced when gum and water are triturated together, is completely avoided. Ibid., December, 1875, p. 355.

Emulsions.—L. C. Hogan draws attention to the circumstance that emulsions of certain oils are occasionally prescribed, without the designation of the quantity of oil desired in such. The Ph. Germ. directs that in all such cases two parts of the designated oil, one part of gum arabic, and seventeen parts of water should be used, and the author suggests that similar provision should be made for the pharmacists of the United States. The Pharmacist, October, 1875, p. 291.

Emulsion of Pumpkin Seed (Emulsio tænifuga).—Desnos gives the following formula: 50 grams of decorticated pumpkin seeds are beaten into a pulp with 5 grams of distilled water; this is mixed with 200 grams of water and 50 grams of syrup of orange-peel. The mixture is taken in two doses in the morning, followed in a few hours by two tablespoonfuls of castor oil.

Emulsion of Resins.—E. Glasse recommends the following modification of Oppermann's method for emulsionizing resins: The resin is pounded as fine as is convenient in a mortar, and is then covered with 2 parts of water and 2 parts of alcohol. The alcohol is ignited, and, when it ceases to burn, 2 parts of gum arabic are added, followed by the usual excipient, which is gradually added with brisk agitation (trituration?). Zeitschr. Oest. Ap. Ver., No. 3, 1876, p. 39.

Glyconated Emulsion of Cod-liver Oil.—T. D. McElhenie has modified the formula proposed by him in June, 1875 (see Report, 1875), as follows: Prepare *glyconin* by triturating thoroughly in a half-gallon mortar 9 drachms each of glycerin and yolk of egg; then add 1 drachm oil of bitter almonds, and again triturate until the mixture thickens and becomes creamy-yellow. Then prepare a *solution of strychnia* by dissolving 1 grain of sulphate of strychnia in 2 ounces of water and 4 ounces of Jamaica rum. Now add 8 fluid ounces of filtered cod-liver oil very slowly to the glyconin, preferably by steady dropping from a vial, with constant trituration, and the occasional addition of the strychnia solution. When finished, and the air-bubbles have escaped, the product will measure about 20 fluid ounces. A dessertspoonful of this preparation contains about $\frac{1}{64}$ grain of sulphate of strychnia, which, obviously, may be substituted by other medicinal agents. The success of the operation depends upon the fidelity with which the author's directions are followed. A. J. Ph., July, 1875, p. 294.

Referring to a statement made by Mr. McElhenie, to the effect that *glyconin*, without oil of almonds, soon separates, Mr. George C. Close states that he has prepared it during the last few years in very large quantities; that it has always kept well, and that, in one instance, he had kept it for five years without change. He also believes the quantity of oil of bitter almonds, recommended by Mr. McElhenie, too large in all cases. Ibid., August, 1875, p. 339.

Ferrated Cod-liver Oil.—The following process by C. Bernbeck recommends itself for convenience, and is said to yield a satisfactory product. The first step in the process is the preparation of *oleate of iron* as follows: Pure olive-oil soap of commerce, which must be perfectly neutral, is reduced to shavings, and dried at a temperature of 30° to 40° C. (= 86° to 102° F.). 1 part of the dried soap is dissolved in 20 parts of boiling distilled water strained through close muslin, and a solution of 1 part of pure sulphate of iron in 10 parts of hot distilled water is stirred in gradually. The precipitate is rapidly collected on muslin, washed, and subjected to strong pressure to remove the water as completely as possible. The cake of oleate of iron so formed is externally brown from the oxidation of a portion of the iron, while internally it retains its whitish-gray color for a long time, when it is preserved with ordinary precaution.

The ferrated oil is then prepared as follows: 4 parts of the oleate of iron are melted upon a water-bath until it has become a uniform limpid liquid; 96 parts of fresh cod-liver oil are then added very gradually, so as to prevent the sudden cooling of the oleate. The heating is then continued for about three-quarters of an hour, the product removed from the water-bath, and filtered. 100 parts of this ferrated oil contains a quantity of iron, chiefly in the state of protoxide, corresponding to 1 part of metallic iron. An incidental advantage of the method is the stability of the oleate of iron, which may be kept on hand, and the oil prepared in quantities suiting the demand. Arch. Pharm., July, 1875, p. 21.

O. Wachsmuth recommends the following modification of the above process: 1 part of a very hot 10 per cent. solution of sulphate of iron is stirred into 2 parts of a very hot 5 per cent. solution of olive-oil soap. A greenish-gray resinous mass of iron soap is immediately formed, which separates on the sides of the vessel and on the stirrer, while the nearly clear solution contains the soluble products of the decomposition, together with the excess of sulphate of iron employed. The insoluble mass is thoroughly washed with hot distilled water; it is then dried in the same vessel on a steam-bath. The yield is 85 per cent. of the soap used. By the gradual addition of the necessary quantity of cod-liver oil, and the application of gentle heat, the oleate of iron dissolves completely, forming a liquid of a dark-brown color, which needs no filtration. The entire operation requires scarcely two hours. The iron soap, while at first greenish-gray, soon becomes oxidized, and acquires a brown color, is soluble in fixed and volatile oils, in ether, chloroform, etc.; insoluble in water, alcohol, and glycerin, and yields on incineration 12 per cent. oxide of iron. Its taste is similar to that of soap. Arch. Pharm., January, 1876, p. 44.

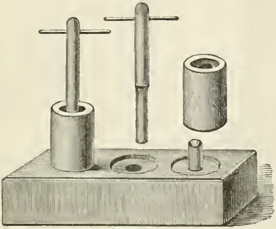
A New Burn Mixture.—Mr. Charles Rice reviews the uses, advantages, and disadvantages of lime liniment (carron oil), collodion, Buck's burn mixture, and lead paint in the treatment of burns, and decides as superior to these the following new mixture: 15 ounces of the best extra white glue is broken into small pieces and softened in two pints of cold water, after which it is melted on a water-bath, 2 fluid ounces of glycerin and 6 drachms of carbolic acid are added, and the heat continued until a glossy tough skin begins to form on the surface in the intervals of stirring. On cooling, this mixture hardens to an elastic mass, which keeps well, may be again readily melted, and is in that condition applied to the parts with a broad brush. In cases of emergency the solution need not be concentrated.

Buck's Burn Mixture, above referred to, is made by incorporating 4 ounces gum arabic, 2 ounces gum tragacanth, and 1 pint of molasses, with sufficient boiling water to make a mixture of the consistence of honey. A. J. Ph., August, 1875, p. 337.

PILULÆ.

Pill Press.—On page 624 of the Proceedings for 1875, Prof. Remington describes a "pill press," used for making compressed pills. This has since been improved, as illustrated by Fig. 14, the construction being as follows: The cut represents a double machine, with which two or more sizes of pills may be made, two and three grain pills on one, and four and five grain pills on the other, one base of cast steel answering for both. The top of the cylinder is provided with a conical depression, which serves as a funnel for the convenient introduction of the powder. The countersunk depressions in the base prevent the cylinder from slipping away in case a side blow is struck. The centre depression is provided with an aperture for the removal of the compressed pill from the cylinder; the cylinder being transferred to this depression after the pill has been formed, and the pill removed by a slight blow.

FIG. 14.



The author still adheres to the opinion expressed (in his paper to the Association in 1875), that compression should not be resorted to as a mode of making pills, when the powder used *is not readily soluble in the digestive fluids.* In all cases the powder should be slightly damp, for if too dry, the pills are apt to split transversely, and a minute quantity of the powder is liable to be blown out of the top of the cylinder when the blow is struck. With due precaution and a little experience pills may be made readily and rapidly. The apparatus not being patented, it may be constructed by any mechanic; it may more conveniently, however, be purchased from the makers. A. J. Ph., March, 1876, p. 97.

Glycerin Dropper.—C. A. Bowman draws attention to a little apparatus, originally constructed by C. W. Wharton, which is illustrated by Fig. 15, and which seems to serve a good purpose for regulating the flow of liquid excipients for pills. It is constructed from an ordinary morphia bottle, into the shoulder of which, through an opening, bored by means of a small rat-tail file, which is kept moist with turpentine, a bent tube is inserted air-tight, and the mouth is closed by drawing a small finger-stall tightly over it. By slight pressure any liquid contained in the bottle flows through the tube drop by drop, or it may be caused to flow in a stream if required. A. J. Ph., March, 1876, p. 99.

Fig. 15.

Louis Emanuel recommends glycerin as a general excipient for pills. Among other advantages, pills made with glycerin never become perfectly hard, and they are more compact than when made with the ordinary excipients, such as syrup of gum arabic, etc. The author illustrates his points by a number of formulas, and draws attention to the convenience of keeping a record of the quantity of excipient required to make pill masses of various compositions. A. J. Ph., May, 1876, p. 205.

Pill Coating.—F. M. Goodman states that the sugar-coating of pills is very much facilitated by previously coating them with mastic, and gives the following directions: The pills are introduced into a patch-box or earthenware jar of convenient size, which is moistened inside with glycerin; for every 100 pills, 10 drops of a saturated ethereal solution of mastic is added, the pills are rotated very rapidly for a few moments, and are then scattered over a plate of glass that has previously been moistened with glycerin. If not thoroughly coated, when dry, proceed as before. Then moisten the pills carefully with mucilage of gum-arabic (1–5) by placing the pills in a box, pouring in the mucilage, rolling them around until moistened, then immediately pour them into a box containing dusted sugar, and roll them with gentle pressure of the fingers, until they are coated. They are now transferred to a sieve, and rolled to remove superfluous sugar; are from this transferred to a clean *damp* box or jar, and rotated rapidly until they become smooth; observing that the pills do not become dry before they are smooth, and redampening the box if necessary. With some practice an even white coating is obtained. For coating pills with French chalk, the author employs an abundance of mucilage so as to enable them to absorb a thick coat of chalk, and the latter should be a very fine and white powder. A moist, soft coating is aimed at, which is subsequently covered by rolling in sugar. A very white, smooth, sugar-coated pill is so obtained. The Pharmacist, January, 1876, p. 1.

Pill Coating with Gelatin.—Charles B. Allaire has contributed a very interesting paper on coating pills with gelatin, in which he gives a detailed description of the process and the construction of the apparatus necessary. The author's paper will be read with interest, and will doubtless enable many to conduct this operation on a large or small scale, as may be justified by the demand. See The Pharmacist, March, 1876, pp. 65–67.

A. F. W. Neynaber recommends the extemporaneous sugar-coating of pills, by dipping them into a concentrated hot solution of sugar, and allowing them to dry; at first, until nearly dry, on the needles, and then on a silk sieve to complete dryness. A semi-transparent sugar-coating is then given, which may be made heavier by a second dipping of the dry, single-coated pills. When properly prepared, the pills have a fine gloss, and somewhat resemble gelatin-coated pills in appearance. If the pills are to be dispensed before they are quite dry, they may be rolled in finely-powdered starch. The sugar solution is made by boiling 32 ounces of the best white sugar with 12½ ounces of distilled water, and it is used at a temperature of 120° to 150°. A very soluble coating is obtained as follows: 1 ounce of flaxseed, ½ ounce Irish moss, boil with 8 fluid ounces of water, strain, add 4 ounces of sugar, boil and use in the same manner as a solution of gelatin is used for coating pills. Dr. Cir., January and May, 1876, pp. 22 and 88.

Ready-made Pills.—Prof. J. P. Remington communicated to the meeting of the Association in 1875 a paper on the ready-made pills of commerce, which is accompanied by a tabulated statement of his experiments made with a view to determine their relative value. Of the four forms of pills, sugar-coated, gelatin-coated, compressed, uncoated pills, the author gives to the last named the preference in point of solubility. Compressed pills are applicable only when the medicinal ingredient is a readily soluble compound, such as bisulphate of quinia, bromide or iodide of potassium, etc. The paper is accompanied by an illustration of a press for making compressed pills.

Mr. Samuel Campbell has since communicated a paper to the Am. J. Ph. (March, 1876, p. 121), on the same subject, in which he criticizes the various commercial forms of pills, and particularly Prof. Remington's views as entertained in the above-mentioned paper. He concludes that in point of solubility, preference should be given to properly prepared compressed pills; next in order are the uncoated or officinal pills; then the sugar-coated, and last, the gelatin-coated.

In the April number of the same journal, Prof. Remington replies to Mr. Campbell's criticisms, and maintains the correctness of his former conclusions.

Pilula Hydrargyri, B. P.—Harold Senier has examined a number of samples of pilula hydrargyri of British commerce, and has found them very satisfactory preparations as regards their mercurial strength. On the other hand, his experiments determine that the quality of the preparation is very much affected by age, inasmuch as the formation of both mercuric and mercurous oxide takes place with comparative rapidity, as is shown by the following table:

	Age.	Metallic Mercury.	Mercuric Oxide.	Mercurous Oxide.	Ash.	Organic matter.
1.	Eighteen hours, .	32.49	none.	a trace.	1.20	66.31
2.	Five weeks, . .	32.26	0 09	0 25	1.20	66 20
3.	Three months, .	31.60	0.24	0 62	1.18	66.36
4.	Three months, .	31.15	0.44	1.60	1.12	65.69
5.	Six months, . .	32.44	0.50	0.80	1.70	64 56
6.	Fourteen months,	29.86	0.98	2.60	1.20	65 36
7.	Nineteen months,	31.59	0.50	2 50	1 00	64.41
8	Two years, . .	28.40	1.80	4.22	2.10	63 48
9.	(?)	30.23	1.06	3.24	1.05	64.42

Of the nine samples only one (No. 3) was hand-made, all the others being made by machinery. The author gives the methods by which the above determinations were made. Ph. J. Trans., February 5th, 1876, p. 621.

Walter E. Bibby has found that the substitution of sugar of milk for powdered licorice-root in the officinal formula, enables the rapid and thorough reduction of the mercury to a minute division. He recommends that one ounce each of mercury, confection of rose, and of sugar of milk be triturated together until the mercurial globules disappear. The mass has the same pilular consistence as when prepared by the officinal formula.

Pulvis Pil. Hydrargyri is readily and expeditiously prepared by triturating together one ounce of mercury and two ounces of sugar of milk, and passing it finally through a sieve or bolting-cloth. The author also recommends the substitution of a portion of the chalk in the formula for "Hydrargyrum cum creta," by sugar of milk, thus: Mercury, ℥iij; prepared chalk, ℥iv; sugar of milk, ℥j. A. J. Ph., June, 1876, p. 268.

Phosphorus Pills.—Messrs. Allen and Hanburys propose the following formula as an improvement of the pil. phosphori, B. P., under the name

Pil. Phosphori cum Sapone.—Dissolve 2 grains of phosphorus in 10 minims, or a sufficiency, of bisulphide of carbon, add to the solution 35 grains each of powdered soap and powdered guaiac resin, 12 drops of glycerin, and 12 grains, or a sufficiency, of powdered licorice root, to make a mass weighing 100 grains, which divide into pills of suitable strength, and varnish or coat them in the ordinary way.

The mass thus formed is of good consistence, easily manipulated, readily miscible with other remedies, and, what is most important, readily soluble. It is hardly necessary to say that the very volatile bisulphide of carbon soon evaporates. Ph. J. Trans., May 20th, 1876, p. 921.

T. Haffenden has been very successful with a formula of Dr. Corfe's; the pills are composed of mucilage, powdered sugar, reduced iron, quinia, phosphorus. By means of a water-bath an emulsion is made of the phosphorus and mucilage, the powders mixed in while warm, and then worked up in a mortar in the usual way; they require to be quickly coated, and will then keep for a long time. Ibid., May 27th, 1876, p. 942.

W. B. Addington gives the following practical directions for making phosphorus pills extemporaneously: Put the required amount of phosphorus in a mortar, and by means of bisulphide of carbon and the pestle dissolve the phosphorus, which is done very readily, incorporate with this solution some extract, such as gentian, taraxacum, etc., and harden the mass, if too soft, by means of a little lycopodium; after which the pills are rolled out of the required strength. A. J. Ph., November, 1875, p. 501.

C. S. Denham dissolves 1 grain of phosphorus in 1½ drachms of chloroform, triturates the solution with 30 grains of powdered licorice until the chloroform is evaporated, adds 30 grains of powdered soap, forms a mass with glycerin, and divides into a suitable number of pills. The Laboratory, October, 1875, p. 17; from Tenn. Ph. Gaz.

Eli Lilly gives the following formula for making a mass, which may be kept in stock for making phosphorus pills of any desired strength: Weigh 260 parts of syrup into a stout bottle of sufficient capacity to hold one-fourth more than the syrup used, heat the bottle and contents to 150° F., drop 6 parts of phosphorus into the warm syrup, and, as soon as melted, close the bottle with a sound cork, take it from the water-bath, give it a gently whirling motion in an upright position until the phosphorus is divided into small globules, and then agitate violently until the contents of the bottle are cold. Pour this mixture upon 340 parts of finely sifted wheaten flour, placed in a mortar, and form the mixture rapidly into a mass, which may then be packed into small, glazed, earthen jars, which are covered with tinfoil to exclude air and retain moisture. A. J. Ph., February, 1876, p. 56.

Phosphorated Resin.—G. W. Sloan finds that glycerin is an excellent vehicle for the administration of phosphorated resin, while gum arabic does not answer. Resin, containing 10 per cent. of phosphorus, may be incorporated with milk sugar and administered with perfect safety in the form of pills or mixture. Proceedings, 1875.

Pills.—Officinal in the "Pharmacopœia" of the Philadelphia Hospital:

Pilulæ Aloes Compositæ.—℞. Powdered Socotrine aloes, ℥ss.; dried sulphate of iron, white turpentine, of each, ʒij; mix and make 120 pills.

Pilulæ Antineuralgicæ.—℞. Arsenious acid, grs. iv; sulphate of strychnia, grs. iij; extract of belladonna, grs. xxiv; sulphate of cinchonia, ʒiij; Vallet's mass, ʒv; mix and make 120 pills.

Pilulæ Cinchoniæ et Arsenici.—℞. Sulphate of cinchonia, reduced iron, of each ℥ss.; extract of nux vomica, grs. xxx; arsenious acid, grs. vj; mix and make 120 pills.

Pilulæ Colocynthidis cum Belladonna.—℞. Extract of belladonna, grs. xv; compound extract of colocynth, powdered Socotrine aloes, of each, ʒiij; oil of anise, gtt. xxx; mix and make 120 pills.

Pilulæ Cinchoniæ Compositæ.—℞. Sulphate of cinchonia, reduced iron, of each, ℥ss.; extract of nux vomica, grs. xxx; mix and make 120 pills.

Pilulæ Opii cum Plumbi Acetate.—℞. Powdered opium, grs. xl; acetate of lead, ℥ss.; mix and make 120 pills.

Pilulæ Podophylli Compositæ.—℞. Resin of podophyllum, grs.

xx; compound extract of colocynth, extract of hyoscyamus, of each, ʒij; mix and make 120 pills.

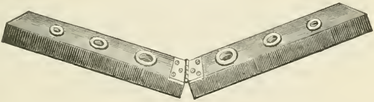
Pilulæ Rhei et Gentianæ.—℞. Powdered rhubarb, ℥ss.; extract of gentian, extract of hyoscyamus, of each, ʒij; mix and make 120 pills. A. J. Ph., March, 1876, p. 138.

PULVERES.

Wafer Capsules.—W. McIntyre makes the following suggestions, which will enable pharmacists to prepare the wafers with but trifling outlay: Sheet wafers, such as are used by fancy cake bakers, are cut into circular pieces by means of a hollow punch. These are slightly dampened by placing them between wet muslin cloths, and each wafer is then pressed between tin plates which have the desired shape of the finished disk. Some wafer-sheets cannot be moistened and worked with advantage this way; but these can be managed by pressing them dry between the previously heated plates. Made by the latter method they have a highly polished surface, and can be manufactured with greater rapidity than the former.

The author also describes a simple wafer-press devised by E. M. Boring, which is illustrated by Fig. 16. It consists of two pieces of one-and-a-half inch hard-wood board, two inches wide, and nine inches long, joined together at one end with a good hinge. The pressing surface consists of concave pieces of brass or metal, having a rim corresponding to the various sizes of wafer disks sunk to a proper level and fastened into the body of the press. For these, buttons for stair-rods answer every purpose. A. J. Ph., January, 1876, p. 26.

FIG. 16.



Willard M. Rice offers some practical observations on dispensing cachets de pain, and on the construction of a cheap apparatus. The latter is essentially that proposed by Mr. McIntyre, differing only from that as above described in having the upper dies (brass stair-rod buttons) attached to handles separate from the press. Ibid., May, 1876, p. 203.

H. P. Lechler communicates a paper on this subject in the March number (1876) of the A. J. Ph., from which it appears that he is not very favorably impressed with their usefulness. Andrew Blair (Ibid., April, 1876) replies to and confutes the author's objections, which seem to be based on very trivial grounds.

Devorative Capsules.—Under this name the chemical factory of Helfenberg, near Dresden, has introduced very thin sheets of wafer-mass, which are used like ordinary powder-paper, except that after the powder has been put upon them the margin is moistened lengthwise with water, the powder then filled in the usual manner, and the ends are likewise fastened by the aid of moisture. The entire capsule with contents is swallowed after having been dipped in water, and, if necessary, rolled up. A. J. Ph., January, 1876, p. 31; from Ph. Centr. Halle, 1875, No. 42.

According to "Schweiz. Wochschr. f. Ph." (No. 50, 1875), these wafer-sheets appear to be principally made of gelatin. They are folded neatly only with difficulty, readily becoming adhesive in a warm place, or if handled with moist fingers, and are, in short, much more inconvenient than are the wafer capsules (cachets de pain). Ibid., March, 1876, p. 131.

Sugar of Milk is recommended by Walter E. Bibby for the purpose of retaining the gum-resins, camphor, etc., in a powdery condition, for which purpose he has used it with good effect. For the gum-resins he recommends 1 part of milk sugar to 2 or 3 parts of the resin; guaiac resin requires about 1 part of milk sugar to 9, and camphor will retain its pulverulent condition in the same proportion. A. J. Ph., June, 1876, p. 267.

Pulvis Glycyrrhizæ Compositus, of the Philadelphia Hospital Pharmacopœia: ℞. Powdered senna, powdered licorice-root, of each, ℥vj; powdered fennel, washed sulphur, of each, ℥iij; sugar, ℥xviij. Mix. Dose, a teaspoonful at bedtime.

Pulvis Sodæ Compositus, of the same hospital, is made as follows: ℞. Subnitrate of bismuth, grs. v; bicarbonate of sodium, powdered ginger, powdered calumba, of each, gr. iiss. Mix. A. J. Ph., March, 1876, p. 138–9.

Effervescing Granular Tartrate of Sodium.—Henry T. Hayhurst obtains a very satisfactory granular effervescing salt of tartrate of sodium by heating 3 parts of pure anhydrous carbonate of sodium and 4¼ parts of pure powdered tartaric acid together, on a sand-bath, taking care to do this in a vessel not affected chemically by tartaric acid, and to keep the mixture well stirred and scraped up from the bottom, so that the resulting compound may not become yellow and carbonized. An agreeable slightly acid salt is produced, which dissolves very readily in water with brisk effervescence, forming a pleasant and cooling drink, and which keeps well. It may be taken in doses of a teaspoonful or tablespoonful dissolved in sweetened water. A. J. Ph., May, 1876, p. 209.

Foot Powder.—Paulke prepares a powder composed of salicylic acid, soap, talc, and starch. The powder renders the feet firm, induces an agreeable softness, and removes all unpleasant odor, its action being to prevent the formation of butyric, valerianic, and other acids of the same family, which injure the feet. Maury, in Rép. de Pharm., October 25th, 1875; Ph. J. Trans., November 13th, 1875, p. 383.

SPIRITUS.

Aromatic Spirit of Ammonia.—William McIntyre attributes the cause of the precipitate occurring in this spirit to the use of stronger instead of alcohol of sp. gr. 0.835, provided that the other ingredients are as required by the Pharmacopœia. Proceedings, 1875.

Bay Rum.—R. Rother finds the following formula to yield a product which possesses a much stronger aroma than the imported bay rum, and is equally satisfactory. Oil of bayberry tree, f℥j; Jamaica rum, Oj; strong alcohol, Oiv; water, Oiij. Mix the rum, alcohol, and water, then add the oil; mix, and filter. The Pharm., May, 1876, p. 131.

SUPPOSITORIA.

A correspondent of the Journal de Pharmacie d'Alsace-Lorraine, commenting upon a paper on the subject of suppositories, which appeared in the Répertoire de Pharmacie, remarks: "Of all the fat excipients that we know cacao butter assuredly is the best for the preparation of suppositories; it is unctuous, hard, fuses at 30° C. (= 86° F.), *i. e.*, 6 or 7 (10 to 12) degrees below the temperature of the human body, and is neither acid nor alkaline. If fat be added, the hardness indispensable for introduction is lost; if wax, the fusing-point is too elevated, and the suppository remains without effect; if, finally, the cacao butter is mixed with wax and lard, one is working in the dark to some extent, and it is easy to ruin the necessary proportions for a suppository which shall melt at the right temperature. Cacao butter, although a fatty body, nevertheless permits, on account of its consistency, of the incorporation of vegetable and saline powders and extracts by simple admixture. Want of care in mixing the remedy so that each suppository shall contain an exact dose is a frequent reason for the disuse of these medicaments by physicians. For example, the pharmacist melts the necessary quantity of cacao butter, adds to it extract of opium, stirs them together, and pours into moulds. The difference in density between the extract and the fat is sufficient to cause a partial separation, so that the quantity of extract varies for each suppository. Further, the extract collects at the points and is liable to be removed by the least jar. A rational method would be to mix the remedy with the cacao butter in a mortar, and to divide the mixture into the necessary portions by weighing. The paper moulds are arranged in slightly damp sand, and each weighed portion is separately warmed in a small spouted capsule over a spirit-lamp. As soon as the mass is in the slightest degree fused it is transferred to one of the moulds, and on cooling a perfectly homogeneous suppository is formed." The Ch. and Dr., June 15th, 1876, p. 205.

R. Sulzer recommends the method of making suppositories without moulds. While the resulting suppositories are less elegant, the method is more practical, and therefore recommended by the author. Schweiz. Wochenschr. f. Ph., No. 21, 1876, p. 172.

The preparation of suppositories containing a quantity of an extract is somewhat tedious and sometimes difficult. The operation is facilitated by forming a soft paste of the extract with water, incorporating this with lard in certain proportions, precisely as if for ointment; the mixture so obtained is then incorporated with a mixture of wax and cacao butter by the aid of gentle heat, and run into moulds in the usual manner; the wax being added to compensate for the lard used. Thus

Suppositories of Rhatany may be prepared with the following proportions of ingredients: 1 gram extract of rhatany; hot water as little as possible; lard, 1 gram; white wax, 2 grams; cacao butter, 1.5 grams. Or,

Suppositories of Belladonna.—Extract of belladonna, 0.01 gram;

lard, 0.5 gram; white wax, 1 gram; cacao butter, 3 grams. The wax is always twice as much as the lard used. Ch. and Drug., September, 1875, page 302; from Rép. de Pharm.

Chloral Suppositories.—H. Meyet prepares suppositories, containing 45 grains of chloral (hydrate?) in each, according to the following formula:

Oleum theobromæ, gr. xxx; cetacei, pulv. chloral., āā gr. xlv. These ingredients form a suppository of good consistence, which may be easily put into use. Dr. Cir., July, 1875, p. 126; from Med. Times.

SYRUPI.

Syrups by Cold Percolation.—At the meeting of this Association in St. Louis (1871), Mr. Orynski proposed a method of preparing the officinal syrups by cold percolation. Robert Hunstock has since operated by the method thus recommended, and considers it far superior to the officinal methods. The required quantity of sugar is introduced into a conical percolator, which is loosely stopped with a clean piece of sponge; the medicinal solution, prepared according to the officinal directions, and filtered perfectly clear, is then poured on, and the orifice of the percolator stopped with a cork. As soon as the sugar has been so far dissolved as to take up a little less than half of its original bulk, the cork is removed, when percolation proceeds rapidly. The result is a perfectly clear syrup, which, the author says, possesses much greater stability than when it is made by the officinal method. A. J. Ph., Sept. 1875, p. 391.

Clay W. Holmes recommends the process of cold percolation for the preparation of syrups. In most cases the formula for syrups need not be changed when applying the process. Proceedings, 1875.

Fruit Syrups.—A. F. W. Neynaber draws attention to his method of making fruit syrups. Two important points in their preparation are, the fermentation of the fruit, and the boiling of the juice and sugar to syrup. In making these syrups, it is of paramount importance that perfectly sound fruit of good flavor should be used. The following method of making

Strawberry Syrup, will illustrate the author's process: Having rejected all unsound or rotten berries, mash the fruit in a barrel or other suitable vessel, by means of a pounder, and leave the pulp for 12 to 24 hours at a temperature of 70° to 80°, stir occasionally, press, set the juice aside for one night, add for every pound avoirdupois of juice one ounce avoirdupois of cologne spirits or deodorized alcohol, mix, set aside for another night, and filter through paper. For one pound of filtered juice, take one and a half pound of A sugar, and heat to the boiling-point, taking care to remove from the fire as soon as the syrup begins to boil, remove the scum, and bottle in perfectly clean bottles, which have been rinsed with a little cologne spirits. The fruit syrups made in this way will have a fine flavor, and will be strong enough to be mixed with 3 to 5 parts (?) of simple syrup for soda water. Dr. Cir., May, 1876, p. 87.

Syrup of Orange-Peel.—Norman A. Kuhn prepares syrup of orange-peel from a fluid extract of the fresh peel, by one of four methods, the fluid extract being prepared by macerating 16 troy ounces of the finely cut peel in one pint of alcohol for a week, with frequent shaking, which affords a handsome preparation of an amber color.

1. One fluid ounce of the fluid extract is triturated with 120 grains of carbonate of magnesium, and 7 fluid ounces of water are gradually added. The mixture is filtered, brought to the measure of 8 fluid ounces, and 14 troy ounces of sugar dissolved in the filtrate by the aid of heat not exceeding 120° F.
2. The syrup is made in the same way, without the application of heat. About two ounces of sugar remain undissolved.
3. One fluid ounce is rubbed with carbonate of magnesium as in 1, 3 fluid ounces of water is added, and the filtrate is brought to the measure of 4 fluid ounces, in which 4 troy ounces of sugar are dissolved without heat. A concentrated syrup is made with 4 fluid ounces of water and 10 troy ounces of sugar, this is allowed to cool until a pellicle begins to form, and the two syrups are then mixed.
4. One fluid ounce of the fluid extract is mixed with 15 fluid ounces of syrup.

The last-named syrup is opalescent, but is superior in flavor to 1 and 3. The only objection to 2 is that the sugar is not all dissolved. Dr. Cir., April, 1876, p. 71.

Syrup of Ipecacuanha.—L. C. Hogan suggests the following modification of the officinal formula for its preparation: Mix 1 fluid ounce of fluid extract of ipecacuanha and 7 fluid ounces of water, allow the mixture to stand two or three hours, filter through paper, dissolve 12 troy ounces of sugar in the clear filtrate by the aid of gentle heat, and when cold, add syrup to make 16 fluid ounces. The Pharmacist, Oct. 1875, p. 292.

Syrups, officinal in the Pharmacopœia of the Philadelphia Hospital:

Syrupus Chlorali.—℞. Hydrate of chloral, ℈lxiv; tincture of cardamom, f℥j; syrup, f℥iv; cinnamon water, sufficient to make Oj.

Syrupus Guaiaci.—℞. Powdered guaiacum resin, ℈xxxij; solution of potassa, f℥ss.; water, f℥viij; sugar, 1 lb. (avoir.).

Syrupus Pectoralis.—℞. Chloride of ammonium, ℥ss.; syrup of senega, f℥j; compound licorice mixture, sufficient to make f℥viij.

Syrupus Potassii Iodidi.—℞. Iodide of potassium, ℥j; compound syrup of sarsaparilla, sufficient to make f℥vj.

Syrupus Potassii Iodidi Compositus.—℞. Corrosive chloride of mercury, gr. ij; iodide of potassium, ℥j; compound syrup of sarsaparilla, sufficient to make f℥vj. A. J. Ph., March, 1876, p. 139.

Syrup of Canada Snake-Root.—A. H. Van Gorder recommends the preparation of such a syrup by adding f℥j fluid extract (which see) to ℥vijss. of sugar, triturating, heating moderately to evaporate the alcohol, adding ℥vijss. more of sugar, and f℥viij of water, heating to the boiling-point, and straining. The syrup may also be made by the intervention of carbonate of magnesium, as in the officinal formula for syrup of tolu. A. J. Ph., April, 1876, p. 157.

Salicylic Syrup.—Maury recommends such a syrup, made with syrup of orange-flower, to contain 5 centigrams of salicylic acid in 20 grams of syrup. Ph. J. Trans., Nov. 13th, 1875, p. 383; from Rép. de Pharm., Oct. 25th, 1875.

Syrup of Iodide of Calcium.—Stanislas Martin has published the following formula for this syrup (in "L'Union Pharmaceutique," xvi, 2): Calcium hydrate, 5 parts, is triturated in a porcelain mortar with 30 parts of sugar; 100 parts of water are added in small portions at a time, and the whole is left in contact for some hours, being occasionally stirred. The solution is then filtered with paper, 2 parts of iodine are added, and when this has dissolved 170 parts more of sugar is dissolved in the liquid. The syrup has the odor of iodine, and an alkaline taste, and may be flavored with orange-flower water or tincture of orange-peel. Ph. J. Trans., October 9th, 1875, p. 299.

Syrup of Protochloride of Iron.—H. William Jones suggests the preparation of a syrup of protochloride of iron in such proportions, that 1 grain of the salt shall be represented by a fluid drachm of a syrup composed of 1 part of orange-flower water, and 4 parts of syrup. A syrup, so prepared, kept well for a month without change. The orange flavor well masks the iron taste and renders the syrup an agreeable preparation. Ph. J. Trans., March 25th, 1876, p. 761.

Syrup of Iodide of Iron.—Alvin G. Hammer has observed that when solution of iodide of iron is brought to the boiling-point with some simple syrup in the presence of excess of iron, and the solution is then filtered into simple syrup, the preparation obtained is perfectly stable. He attributes this to the fact that the cane sugar is partially converted into grape-sugar, which he believes possesses the power of preventing the change of ferrous into ferric iodide. He proposes therefore the following modification of the officinal formula:

Dissolve two troy ounces of iodine in three fluid ounces of water by the aid of 300 grains of iron wire, and as soon as the solution acquires a greenish color, add to the mixture four fluid ounces of simple syrup, and heat the mixture slowly to the boiling-point; then heat 12 fluid ounces of simple syrup in a graduated bottle to 212° F., filter into this the hot solution of iron, agitate thoroughly, allow to cool, and bring the measure of the liquid to 20 fluid ounces. The Pharmacist, April, 1876, p. 99.

Syrup of Iodide of Iron.—Prof. J. F. Judge recommends hypophosphorous acid to restore changed syrup of iodide of iron to its normal condition. He finds this acid equally efficient to hyposulphurous acid (in form of soda salt), which was proposed some years since; and it is superior, because with the latter there occurs a precipitation of sulphur and consequently turbidity. A. J. Ph., April, 1876, p. 159.

Syrupus Arseniatis Ferrosus.—H. P. Madsen suggests the following formula, which is based upon the solubility of ferrous arseniate by the aid of citric acid. Dissolve 0.05 grams of citric acid in 45.00 grams of solution of arseniate of sodium of the Pharm. Danica (= 1 part in 500 parts of water). Then dissolve 0.09 grams of protosulphate of iron in 5.00 grams of distilled water, add this solution to the first, and the mixture to 450.00 parts of syrup. 10 grams contain 1 milligram of ferrous arseniate. A. J. Ph., December, 1875, p. 536; from Ny. Pharm. Tid., 1875, p. 295.

Phosphate Syrups.—W. L. Howie read an interesting paper on the nature, causes, and prevention of certain precipitates which form in phosphate syrups, at a meeting of the North British Branch of the Pharmaceutical Society of Great Britain. The precipitates may be either grape-sugar, ferric phosphates, or phosphate of quinia. The first, grape-sugar, is owing to the conversion of cane-sugar into glucose, and may be readily prevented by using less sugar than is directed in the formula. For instance, the quantity directed in Parrish's formula is too large. The density of this syrup should not exceed 1.33. Without going into the author's speculations of the causes which occasion the precipitation of ferric phosphates, it may be stated that he advocates the direct solution of metallic iron in phosphoric acid, as in the following modification of the syrupus ferri phosphatis, B. P.:

Iron,	38 grains.
Phosphoric acid, sp. gr. 1.5,	6 fluid drachms.
Water,	6 " "
Syrup,	8½ fluid ounces.

Mix the phosphoric acid with the water, and dissolve the iron in the mixture, plugging the mouth of the flask with cotton, then filter, and add the syrup. Contains 1 grain of ferrous phosphate in each fluid drachm. Ordinary iron is unsuitable, as it contains besides a large percentage of carbon (as graphite), a quantity of sulphur, which communicates an offensive smell to the solution. Swedish or Norwegian iron, smelted with charcoal, and known as "charcoal iron," is most suitable for such purposes. For compound syrup the phosphate solution should be prepared of such strength that it may be added to a thick sugar syrup, so as to form the finished preparation. The cause of the separation of quinia is somewhat obscure. It seems never to form in syrup which has been quickly made, and neither the quinia solution nor the syrup exposed as in filtration. It has struck the author as curious that some pharmacists, whose process for making the syrup containing quinia (Eaton's) is simply "mix and shake," are "never troubled with it, and cannot understand how any one should be;" and several others, whose recognized aim is to send out articles in speckless perfection, not unfrequently are annoyed to find their care result in such an unsightly product. Of several samples shown by the author all that had crystallized were filtered through paper, either before or after mixing the phosphate solution with the syrup. In syrups prepared without exposure to filtration he has never known this precipitate to form. The lime salt gives no trouble in compound syrups, when once dissolved, and the syrup is not subsequently heated. The change of color, occurring in the phosphate syrups containing ferrous phosphate, is best prevented by excluding atmospheric air. It has been suggested that the solution of phosphate should be kept separate from the syrup and mixed as wanted, and this in some quarters has met with considerable favor. But unless the solution be kept carefully in closed vessels it is even more liable to become peroxidized in this form than when mixed with syrup, and when peroxidation has taken place to any extent the ferric precipitate is sure to form in a few days after mixing the iron liquor with the syrup. Ph. J. Trans., April 8th, 1876, pp. 804–811.

Syrup of the Phosphates of Iron, Quinine, and Strychnia.—J. W. Watts gives the following formula: Dissolve ʒiv and grs. 16 of sulphate of iron and ʒviij and grs. 32 of sodium phosphate, each in ℥iv of boiling water, mix; collect and wash the precipitate; dissolve ʒij and 8 grains of sulphate of quinia in ℥iv of cold water by the aid of hydrochloric acid, precipitate with ammonia water, collect and wash the precipitate; add the precipitates and 4 grains of strychnia to ℥viij of dilute phosphoric acid, stir well, and if any portion of the precipitate should fail to dissolve, add sufficient hydrochloric acid to effect solution. Filter, and dissolve sufficient sugar in the solution to make one pint of finished syrup. A. J. Ph., February, 1876, p. 57.

Syrup of Lacto-phosphate of Iron.—C Jehl communicates in Jour. de Pharm. d'Alsace-Lorraine (December, 1875), the following formula for sirop de lactophosphate de fer: Dissolve 50.0 of crystallized sulphate of iron in 750.0 of distilled water, and 150.0 of phosphate of sodium in 750.0 of distilled water. Mix the solutions, wash the precipitate, dissolve it in 60.0 of lactic acid, add sufficient water to make 1882.0, dissolve in the clear liquor 3586.0 of sugar, and flavor the syrup so obtained with 50.0 syrup of recent lemon-peel; 20.0 of this syrup contains 0.1 of phosphate of iron. Hager states that a syrup of the same strength may be obtained more readily and of greater stability as follows:

Dissolve 4.5 of lactate of iron in 10.0 of phosphoric acid, sp. gr. 1.120, and 85.0 of syrup by the aid of gentle heat; add to this 400.0 of syrup, and flavor it with 2.0 elæosacchari citri. Ph. C. H., December 23d, 1875, p. 431.

Syrup of Lacto-phosphate of Lime is made by the same author according to the following formula: Basic phosphate of lime (Falières, which see under Calcium in this report), 13.30 grams; concentrated lactic acid, 24 grams; distilled water, 300 grams; white sugar, 625 grams; alcoholate of lemon (Codex), 15 grams; 20 grams of this syrup contain the elements of 0.20 grams of anhydrous tricalcic phosphate.

Syrup of Lacto-phosphate of Iron and Lime is made by dissolving 9.25 grams of pure sulphate of iron in 150 grams of distilled water, and 27 grams of crystallized phosphate of sodium in 150 grams of distilled water, uniting the two solutions, washing, and draining on the filter until it weighs only 100 grams. Then dissolve the precipitate in 11 grams of concentrated lactic acid, and mix the solution with a solution of 13.30 grams of basic phosphate of calcium in 24 grams of concentrated lactic acid, and 100 grams of distilled water. Make the mixed solutions weigh 388 grams; dissolve in it 625 grams of sugar, and flavor with 15 grams of alcoholate of lemon. 20 grams of this syrup contains 0.20 grams of anhydrous tricalcic phosphate and 0.10 of ferrous phosphate.

Solution of Chlorhydro-phosphate of Lime (Liqueur de Coire) can be prepared instantaneously by dissolving 26.50 grams of basic phosphate of calcium in 30 grams of hydrochloric acid (sp. gr. 1.17) and 945 grams of distilled water. 20 grams of this solution contain 0.40 grams of anhydrous phosphate.

Syrup of Chlorhydro-phosphate of Iron and Lime is made according to the following formula, the manipulation being indicated by the above formulas:

(1.) Pure sulphate of iron, 18.50 grams; phosphate of sodium, 54 grams; distilled water, q. s.; hydrochloric acid (sp. gr. 1.124), 20 grams.

(2.) Basic phosphate of calcium, 40 grams; distilled water, q. s.; hydrochloric acid (sp. gr. 1.124), 55 grams.

(3.) Filter liquor, 1450 grams; white sugar, 2500 grams; alcoholate of lemon, 50 grams.

This syrup contains 0.12 per cent. of metallic iron, 1 per cent. of dry phosphate of calcium, and 0.50 per cent. of dry hydrochloric acid. Ph. J. Trans., May 6th, 1876, p. 881.

Syrup of Lacto-phosphate of Lime.—J. W. Watts suggests the following formula: Dissolve ʒiv and 16 grains of phosphate of calcium in ℥iv of water by the aid of hydrochloric acid, precipitate the filtrate with ammonia-water, collect and wash the precipitate, triturate it with ℥vij of dilute phosphoric acid and ℥j of lactic acid (dil.), and if the precipitate should fail to dissolve completely, add sufficient hydrochloric acid to effect solution. In the filtrate dissolve sufficient sugar to make one pint of finished syrup. A. J. Ph., February, 1876, p. 58.

TINCTURÆ.

Tincture of Arnica.—Instead of following the officinal directions, "to moisten the arnica slightly with a portion of the menstruum, then to bruise the flowers thoroughly in a mortar, packing in the percolator," etc., J. B. Moore advises that the arnica flowers be passed through a sieve, 20 to 30 meshes to the inch, then moistening well with the menstruum, packing into a percolator, and proceeding as directed in the officinal formula. When arnica flowers are well dried—by exposure to sun and air in summer, to a heat not exceeding 120° in winter—they will readily and rapidly pass through a sieve of the above-mentioned fineness, by simply rubbing with the hand. Dr. Cir., August, 1875, p. 138.

Tincture of Capsicum, U. S. P.—G. W. Kennedy finds that by the officinal process the capsicum is not completely exhausted, the menstruum, dilute alcohol, being too weak. He therefore suggests the use of alcohol instead, which not only completely exhausts the capsicum, but secures a more elegant preparation. A. J. Ph., March, 1876, p. 102.

Tinctures, officinal in the Pharmacopœia of the Philadelphia Hospital:

Tinctura Aromatica.—℞. Coriander seed, ʒij; angelica seed, ʒiiss.; glycerin, f℥v; syrup, f℥vj; diluted alcohol, sufficient to make Oij tincture.

Tinctura Ferri Composita.—℞. Sulphate of cinchonia, ʒi; sulphate of strychnia, gr. ij; tincture of chloride of iron, f℥j; syrup and water, of each sufficient to make f℥viij.

Tinctura Saponis Viridis cum Pice.—℞. Tar, green soap, methylic alcohol, of each ℥j. Mix, with gentle heat.

Tinctura Styptica.—℞. Carbonate of potassium, ʒj; soap, ʒij; alcohol, f℥iv. Mix. A. J. Ph., March, 1876, p. 139.

Tincture of Canada Snakeroot.—A. H. Van Gorder recommends its preparation by percolation with alcohol sp. gr. 835; the strength to be 4 ounces to the pint. A. J. Ph., April, 1876, p. 156.

Tinctura Croci is suggested by H. M. Wilder in the proportion of 2 ounces to the pint, or 1 ounce to 10 fluid ounces; the menstruum being a mixture of 3 volumes of alcohol and 1 volume of water. Such a tincture would serve a good purpose in preparing Huxham's tincture, still preferred by some physicians, extemporaneously, by adding 25 minims to a fluid ounce of compound tincture of cinchona. A. J. Ph., September, 1875, p. 393.

Tincture of Coto Bark.—Dr. C. G. Wittstein, who has subjected coto bark, a new Bolivian remedy and specific for diarrhœa, to chemical examination (see under Materia Medica in this report), recommends a tincture, prepared from 1 part of coarsely-powdered bark with 9 parts of 85 per cent. alcohol. Ph. Centr. H., No. 45, pp. 377–379.

Tinctura Frangulæ Reichii.—A tincture of buckthorn bark is recommended to be made by boiling 100 grams of the bark with sufficient water to make 600 grams of decoction, evaporating this to 100 grams, and adding 80 grams of diluted alcohol. The dose is two teaspoonfuls before bedtime.

Tinctura Opii Muriatica.—George W. Kennedy contributes the following for an *acid infusion of opium*, which in certain localities is described under the above name. Macerate 1 troy ounce of powdered opium in a mixture of 1 fluid ounce of muriatic acid and 15 fluid ounces of water for fourteen days; filter, and make the finished preparation measure a pint by the addition of water.

In a note to Mr. Kennedy's communication, Prof. Maisch draws attention to a formula for *muriate of opium* in Griffith's Formulary (2d ed., p. 341; 3d ed., p. 425), which is credited to Nichol, and which differs from the above in directing more of water: 1 ounce opium; 1 ounce muriatic acid; 20 fluid ounces water. A. J. Ph., November, 1875, p. 498.

Tincture and Solution of Perchloride of Iron.—William Inglis Clark reviews the various methods for the preparation of perchloride of iron, and recommends the following method as superior to any, since a minimum quantity of nitric acid and very little heat is required; the heating, under ordinary conditions, driving off a portion of muriatic acid, and forming an oxychloride. Saturate a definite quantity of aqueous hydrochloric acid with iron, and, having filtered the solution, add five-eighths as much more acid as was used at first, along with one-eighth part of nitric acid. The liquor being allowed to stand for several hours is partially oxidized, the compound of ferrous chloride and nitric oxide, $4FeCl_2,2NO$ ($O = 16$), forming thick masses at the bottom of the vessel. A portion of the solution is then heated until the oxide is evolved, and as the remainder is added in successive portions to the hot liquid, the gas is given off at once, and ferric chloride left.

Regarding the tincture, the author remarks that the very dark color often observed is owing to one of several causes. These are, that the liquor may have been boiled during the preparation, and a deficiency of hydrochloric acid and presence of basic salts be the result; or that the tincture may have darkened from keeping, with the same results as the last in the long run; or that the liquor, not being thoroughly oxidized, would retain a certain quantity of the compound of ferrous chloride and nitric oxide. When a tincture is very light-colored, this is either owing to a deficiency in perchloride of iron, or it may be owing to exposure to light. When the tincture is exposed to light for a few days, a very powerful ethereal odor is developed; this takes place in the dark also, but very much more slowly. Should the hydrochloric acid be in slight excess, the liquid also becomes lighter in color, ferrous chloride being formed. The formation of the odorous compound appears to be independent of the presence of nitric acid, since tincture made by the old process, with ferric oxide and hydrochloric acid, as well as by Rother's method (oxidation with chlorate of potassium), acquired the peculiar ethereal odor after a few days' exposure to light.

The author also makes some observations on the contraction of solution of chloride of iron when diluted with water, and the consequent heat evolved, and illustrates this by a tabulated statement. He likewise gives some interesting points regarding the crystallization of ferric chloride from concentrated solutions. A solution, corresponding in strength to sp. gr. 1.500, if left standing for several hours, begins to crystallize in pale-yellow nodular masses, which consist of a hydrate containing 40 per cent. of water, and having the formula $Fe_2Cl_66H_2O$ ($O = 16$). A hydrate containing 25 per cent. of water and crystallizing in rhombic plates is said to exist, but the author has been unable to obtain it. A third hydrate, having the formula $2Fe_2Cl_65HO$, crystallizes in reddish-yellow crystals from a solution of sp. gr. 1.600. These crystals deliquesce in moist air, forming a liquid of sp. gr. 1.545, which may be evaporated so as to form a supersaturated solution having a sp. gr. of 1.763, and which is very apt to form crystals; simple agitation, the dropping in of a single crystal, or a particle of dust, determining the crystallization in a few seconds. Ph. J. Trans., February 12th, 1876, pp. 642 to 646.

Tincture of Chloride of Iron.—Ten commercial samples of tincture of chloride of iron, subjected to examination by Isaac R. Diller, proved that in the main the tinctures, as prepared in the different stores, are of satisfactory ferric strength. One sample, however, yielded but 17.5 grains of ferric oxide per fluid ounce, showing in this instance a deficiency of 11.3. Two samples contained a small excess. The greatest difference existed in the color of the preparations, which varied between pale-lemon and rich brownish-orange. A. J. Ph., May, 1876, p. 210.

Fourteen commercial samples of muriated tincture of iron, subjected to analysis by G. W. Hoyt, proved very variable in their composition. The quantity of iron in two fluid drachms should be 7.0625; it was found to vary between 3.9 and 7.5 grains. The quantity of hydrochloric acid in the same quantity of tincture should be 13.8 grains; it varied between 7.23 and 17.99 grains. The alcoholic strength should be 67.125 per cent.; it varied between 21.1 and 81 per cent. The Pharm., June, 1876, p. 163.

TROCHISCI.

Tasteless Quinia Pastilles.—Rosznay prepares tasteless quinia pastilles in two varieties, the one prepared with sugar and tannate of quinia, the other containing chocolate instead of sugar. Each pastille contains 0.2 grams of the tannate, and the latter being very carefully prepared, they are entirely free from bitterness, and are readily taken by children. Ph. Central Halle, No. 15, 1876, p. 123.

Salicylic Acid Lozenges.—Maury recommends lozenges of gum and sugar, containing each 25 milligrams of salicylic acid. Ph. J. Trans., Nov. 13th, 1875, p. 383.

VINA MEDICATA.

Rennet Wine.—Selldin communicates a series of experiments upon the coagulating power of the "Liquor ad serum lactis parandum," of the Scandinavian Pharmacopœia, by which he proves that its coagulating power is due to the pepsin it contains, and that by the method of its preparation the greater part of the pepsin is precipitated, and consequently lost. He advocates the use of Scheffer's saccharated pepsin, or a glycerin extraction of either the mucous membrane of the pig's stomach or of calf's rennet, as a substitute for rennet wine. When calf's rennet is to be extracted with glycerin, the "portio pylorica" should be completely removed, else the liquid will filter with exceeding difficulty. Arch. Ph., Oct. 1875, p. 333.

Salicylic Wine is recommended by Maury, of the strength of 2 grams of salicylic acid to 100 grams of Muscat wine. The author also recommends a

Wine of Cinchona and Salicylate of Quinia, made from 30 grams cinchona bark, 1 gram salicylate of quinia, and 1000 parts of Madeira wine. Ph. J. Trans., Nov. 13th, 1875, p. 383; from Rép. de Pharm., Oct. 25th, 1875.

Wine of Lactophosphate of Lime.—J. W. Watts recommends for its preparation to follow his method for preparing the syrup—which see under Syrups—and to substitute sherry wine for the sugar in that formula. A. J. Ph., Feb. 1876, p. 58.

MISCELLANEOUS SUBJECTS.

Infant Food.—H. Muller communicates some critical remarks upon the subject of food for infants, and gives the analysis of two such preparations, the composition of which seems to him to be adapted to the intended use. The first of these is a preparation manufactured in Switzerland, by Nestlé, under the name of "Kindermehl" (meal for children). This, it is stated, is prepared essentially from milk and wheat flour, sugar, and nutrient salts, the components of which are represented by the meal in a condition which enables the production of an excellent soup for infants by simply boiling with water. The author found this preparation to contain

1.6 per cent. N. = 10.0 per cent. albuminoids.
1.8 per cent. Ash., containing 22.6 per cent. phosphoric acid.

The other preparation, and the one to which the author gives decidedly the preference, is the so-called "Göttinger Kindermehl," prepared by Faust & Schuster. These gentlemen give the composition of their food, based upon the analysis of Dr. von Uslar and Dr. Polstorff, as follows: 11.51 per cent. protein substances, 79.61 per cent. respiratory nutrient substances (carbohydrates), 1.80 per cent. nutrient salts, and 6.73 per cent. moisture. The inorganic salts contain 32.05 per cent. of phosphoric acid, and 28.0 per cent. potassa. An analysis made by the author corresponds as closely with this statement as it is possible to expect from such a preparation. 56.04 per cent. of the powder was found insoluble in cold water; 36.70 per cent. was soluble in cold water, and 4.34 per cent. was found to be glucose. Arch. Pharm., Aug. 1875, p. 137.

Substitute for Mother's Milk.—According to Beno Martiny, the yolk of chicken egg, which weighs, on an average, 15 grams, when diluted with 57.1 grams of water, at 100° F., in which 5 grams of milk sugar are dissolved, affords the best substitute for mother's milk, having nearly the same composition as the milk in the first period of lactation. Subsequently the fat and protein decrease, and one yolk may be added to 100 grams of water and 6 grams of milk sugar. From the fourth a little cow's milk may be added, and gradually increased until it forms one-third of the mixture, when, also, the egg albumen is to be added. After about 15 months the eggs may be boiled soft, and given separately. A. J. Ph., Nov. 1875, p. 503; from Zeitschr. Oest. Apoth. Ver., 1875.

Medicated Ice.—Edward Martin suggests medicated ice for the administration of certain medicinal agents to children. By means of this children may be made to take medicine which, in any other form, they will persistently refuse. The medicinal substance is dissolved in water, the solution is placed in a test-tube, and this is immersed in a mixture of pounded ice and salt. When quite solid, a momentary dip of the tube into hot water enables one to turn out the cylinder of ice. The medicated ice is especially intended for scarlatinal throat in young children, the following formulas having been tried with satisfaction by the author:

1. Sulphurous acid, half a drachm; water, seven drachms and a half; mix and freeze.
2. Chlorate of potassium, one scruple; water, one ounce; dissolve and freeze.
3. Solution of chlorinated soda, half a drachm; water, one ounce; mix and freeze.

Though not as tasteless as pure water, the flavor is so much lessened that the little sufferers generally take it readily. Ph. J. Trans., Jan. 29th, 1876, p. 606.

Iodinized Cotton.—Méhu prepares such a preparation, which, he states, possesses all the properties of iodine, and is very convenient. About 5 to 10 parts of finely powdered iodine is spread upon layers of cotton contained in a glass vessel, which is then heated in a horizontal position on a sand or water bath, and as soon as the hot air is expelled, the vessel is closed tightly. By continuing a regular heating, the iodine rises in violet vapors, and penetrates and colors the cotton. The operation requires about 2 hours, and is finished when the cotton has assumed a color resembling parched coffee. Iodinized cotton, prepared by saturation with iodine solutions in ether, bisulphide of carbon, etc., or by causing the vapors of such solution to pass through it, does not retain much iodine. Ph. C. Malle, Dec. 30th, 1875, p. 443; from Rép. de Pharm.

Toothache Remedy.—Richter recommends the following remedy for toothache, to prevent its occurrence, and to destroy the disagreeable odor of decayed teeth: 5 grams absolute alcohol, 8 drops carbolic acid, and 5 to 10 drops oil of peppermint. A small quantity of this mixture is poured upon the tooth-brush, which is either slightly moistened with water or dry according to the condition of the gums. The remedy is very highly recommended by Dr. Reclam and others. Ph. Centr. Halle, Jan. 1st, 1876, p. 4.

Antiseptic Mouth Paste.—Maury recommends that 2 grams of salicylic acid be incorporated with 34 grams of honey, or that 2 grams of the acid be triturated with 20 grams of sugar, and the powder used extemporaneously for sore mouth by moistening with water, and applying to the sore parts by means of a brush. Ph. J. Trans., Nov. 13th, 1875, p. 383; from Rép. de Pharm., Oct. 25th, 1875.

Injection of Salicylic Acid.—A solution of 1 part of salicylic acid in 300 parts of water has been used as injection in fluor albus. Maury, in Rép. de Pharm., Oct. 25th, 1875; Ph. J. Trans., Nov. 13th, 1875, p. 383.

Liquid Glue.—One part of phosphoric acid, sp. gr. 1.120, diluted with 2 parts of water, is nearly neutralized with carbonate of ammonium, one part of water added, and then, in a porcelain vessel, sufficient glue dissolved in the liquid to obtain a syrupy consistence. It must be kept in well-closed bottles. The addition of glycerin or sugar will cause the glue to gelatinize.

The addition of chloride of calcium to a solution of glue is recommended to prevent it from cracking by heat or extreme dryness. Thus prepared, it can be used upon glass and metallic surfaces. A. J. Ph., May, 1876, p. 219.

Knaffl digests 3 parts of glue in fragments with 8 parts of water, adds after a few hours, ½ part of hydrochloric acid and ¾ part of sulphate of zinc, and continues the digestion for 10 to 12 hours at a temperature of 65–70° R. (=178.25°–189.5° F.). The glue retains its liquidity, is clarified by subsidence or other means, and is excellent for all the purposes to which it is usually applied. Zeitschr. Oest. Ap. Ver., No. 26, 1875, p. 425.

Insoluble Cement for Glass is obtained, according to Prof. H. Schwarz, by dissolving one part of bichromate of potassium for every 5 parts of gelatin or glue in a solution, containing 5 to 10 per cent. of the latter. After having been applied to the glass, the cement, on exposure to sunlight, loses its property of swelling and dissolving in water, in consequence of the partial reduction of the chromic acid. A. J. Ph. March, 1876, p. 132.

Indelible Ink, which will withstand the action of chlorine, may be made, according to Reinman's Faerberzeitung, by mixing 10 parts coal tar, 10 parts benzin, and 1 part lampblack. The mixture is applied upon the well-dried fabric with a stamp, and allowed to become thoroughly dry. Ph. Centralhalle, No. 37, 1875, p. 316.

Indelible Ink for Rubber Stamps.—Crystallize anilin black, ½ ounce, dissolve in pure alcohol, 15 ozs., add glycerin, 15 ozs. This excellent ink to be poured on the cushion and rubber with a brush. Dr. Cir., May, 1876, p. 87.

Copying Pencils.—Ch. Viedt prepares pencils which give traces, capable of being copied like those of copying inks, from graphit ground up in water to a fine paste, finely powdered kaolin, and a highly concentrated solution of an anilin violet-blue, soluble in water. Ch. N., July 16, 1876, p. 30; Bull. Soc. Chim., Paris, No. 11, 1875.

Retouching Varnish for Photographers.—The following formula given in Photo. Arch. (16, 175), is said to yield a varnish, which very much aids the retouching of photographic plates, and seems to be applicable to other uses: 100 c.c. ether; 1 gram shellac, 6 grams sandarac, 6 grams mastich. When solution is effected, it is filtered, and 10 c.c. benzole (not petroleum benzin) added. It affords a dim layer when poured cold upon the plates; if the grain is not fine enough, a little more benzole is added. Ch. C. Bl., No. 48, 1875, p. 768.

Utilization of Old Corks.—J. B. Moore reclaims old corks as follows: The corks are soaked in water for 24 hours, then washed several times with clean water, after which they are macerated for several hours in a mixture consisting of 1 part of muriatic acid and 15 parts of hot water. Removed from this, they are thoroughly washed and dried, and are then again as bright and clean as originally, and suitable for most purposes for which the new corks are used. A. J. Ph., Oct. 1875, p. 466.

MATERIA MEDICA.

a. Vegetable Drugs.

GENERAL SUBJECTS.

Morocco Drugs.—A. Leared and E. M. Holmes have received additional supplies of Morocco drugs, by which they are enabled to throw additional light upon the drugs of that country. The following are described:

Bohior; the radical leaves of a species of *Eryngium*, apparently *E. tricuspidatum*, Desf.

Elhet Lehode; the entire plant of *Asphodelus tenuifolius*, Cav.

Adad; as previously conjectured, the root of some species of thistle.

Ark Abu; appears to be the root of *Daucus crinitus*, Desf.

Ark Egordy, or Igudu; apparently the root of a species of *Aristolochia.*

Bocbookah; a plant with a root attached corresponding with the drug described by the author in the Ph. Journal (3), V, p. 522, as Ark Abu, a name which, as is apparent from the specimen now sent, should be applied to the large root described under that name in the present paper.

Cact. ana; consists of a mixture of the root of Elod Elhmar and a root resembling in many respects the root of Bocbookah, from which it differs chiefly in having a yellow meditullium.

Elod Elhmar is the root of a species of *Armeria*, probably *A. mauritanica*, Wallr.

Feshook or Fasogh; the root is probably that of *Ferula orientalis*, L., to which, indeed, Lindley refers the Morocco drug named Feshook or Fasogh. The root is one of considerable interest, since it is sent as that of the plant which produces the African ammoniacum. The taste of the gum-resin of the root is found to differ slightly, however, from that of a specimen of African ammoniacum presented to the museum of the Pharmaceutical Society by Mr. D. Hanbury.

L'fuely; the root of *Astragalus eriophaca*, Ball. *Phaca Vœtica*, L. Pharm. Jour. Trans., August 21st, 1875, p. 141.

Drugs in the India Museum at South Kensington.—A review of the collection of articles of Materia Medica in the India Museum, is given in the "Pharm. Journal and Transactions," and runs through several numbers in July, August, and September. Some of the most interesting articles in the collection are referred to elsewhere in this report, designated by the affix I. M., at K.

Preservation of Herbs.—In the opinion and experience of J. U. Lloyd, none of the ordinary methods that have been suggested from time to time, will answer for the preservation of herbs. He has given much attention to the subject, and has found that herbs are best kept in hermetically-sealed tin cans in the presence of a little chloroform, about half an ounce of the latter being used for each pound of the herb. The herb is gathered when in its prime, quickly and carefully dried, pressed by hand into the can, sprinkled with the chloroform, and the cover rendered air-tight by painting the edges with melted beeswax. Parsley-root, burdock-root, motherwort, etc., which are particularly liable to the attacks of insects, are thus perfectly preserved from one season to the next. The author does not think that the use of chloroform in this connection is objectionable, since the small quantity used is rapidly dissipated upon exposure. A. J. Ph., May, 1876, p. 197.

Herb Packing.—A. W. Miller has investigated the subject of herb packing, and arrives at the conclusion that the most suitable method is to place them loose into suitable pasteboard boxes. Such boxes are now made, and furnished at a moderate cost, by the Novelty Paper-box Company (of Philadelphia). Proceedings, 1875.

Coto Bark.—Under this name a bark has been introduced from Bolivia, where it has a high reputation as a remedial agent in diarrhœa, colic, etc. Prof. C. Harz describes its physical characters and has examined it microscopically. Dr. G. C. Wittstein has determined its components, and Dr. von Gietl has experimented upon its therapeutic value.

The bark occurs in irregularly broken pieces of from 0.2 to 0.3 metres length, which are flat or but slightly convex, and of a thickness varying between 8–14 millimetres. Its color is cinnamon-brown; its odor very aromatic, reminding of cardamom, camphor, and oil of cajuput; its taste aromatic, pungent, reminding of pepper, camphor, and oil of cajuput, slightly bitter, and neither mucilaginous or astringent. The outer surface is quite even, utterly devoid of cork-formation, and reminds in its appearance of the bark of moderately thick beech branches. The outer bark breaks with an even fracture, while the inner portion has an exceedingly irregular, coarsely fibrous, and splintery fracture.

Its chemical components are:

1. *A volatile oil*, which is of pale-yellow color, strong aromatic odor, sharp peppery taste, and is lighter than water.

2. *A volatile alkaloid*, resembling *propylamina* in its odor.

3. *A soft resin*, which is yellowish-brown, has an aromatic odor and a pungent taste, is readily soluble in alcohol, ether, and chloroform, with difficulty in benzol, and scarcely in bisulphide of carbon. It is acid in its reactions, dissolved readily by ammonia and the fixed alkalies, again precipitated from such solution by acids, and amounts to one-seventh of the bark.

4. A hard resin, dark-brown in color, brittle, odorless, tasteless in substance, but its alcoholic solution is slightly bitter. While readily soluble in alcohol (such solution reacting acid and in alkaline solutions), it is insoluble in ether, chloroform, benzol, and bisulphide of carbon. The bark contains about 10 per cent.

5. Starch, gum, sugar, oxalic acid (as lime-salt), irongreening tannic acid, formic, butyric, and acetic acid.

6. Its inorganic constituents, amounting to 1.8 per cent., are composed of lime, soda, potassa, alumina, magnesia, iron, manganese, sulphuric acid, phosphoric acid, silicic acid, and chlorine.

Administered in the form of powder and of tincture, it was by Dr. Von Gietl found to be a valuable medicine in the treatment of diarrhœa, for which, in its various modifications, he regards coto-bark to be a specific. The tincture is prepared by Wittstein from 1 part of the bark, with 9 parts of 85 per cent. alcohol. Ph. Centralhalle, No. 45, pp. 377–379, and p. 381.

In addition to the components of coto bark, found by Wittstein, Julius Jobst has determined the presence of a crystalline neutral principle, which he names cotoin. It exists to the amount of 1½ per cent. See Glucosides, in this report.

FUNGI.

Ergot.—Prof. R. Buchheim has made some interesting experiments upon the active constituent of ergot, which are detailed in in a communication to "Archiv für Experimental-Pathologie und Pharmacologie," and are condensed in Archiv Pharm. (July, 1875, pp. 32–39). Ergot being a fungous parasite, it must necessarily derive its nourishment from the plant upon which it is formed. Hence the ergot of rye can contain no principles which are not derivable from the principles existing in the rye plant, and, therefore, the author argues, the chemical examination of ergot of rye must be accompanied by a comparison of the constituents of the rye and of the ergot, in order to ascertain the nature of the changes which have occurred. Thus, a comparison of the ash constituents, although this is not based upon those of rye and ergot grown upon the same soil, shows very close relation. The cellulose of ergot, while showing a different reaction with iodine and sulphuric acid, need not, therefore, be regarded as having a different composition from that of rye. Ergot contains an abundance of oil, whereas rye contains but sparing quantities. It is utterly devoid of starch, and contains no glucose, but, in lieu of the latter, contains a peculiar sugar, which has been named "mycose." Both ergot and rye contain albumen, although it is present in the former in but sparing quantities. None of these principles seems to be regarded by the author as the source of the active constituent, which he is led to believe by his experiments is derived from the gluten of the rye, and which bears great resemblance in its general characters to animal glue. He calls this active constituent "Ergotin," and obtained it as follows: The ergot is extracted with cold water, evaporated to syrupy consistence, and treated with alcohol according to the process of the Pharm. Germ. for extract. secal. cornut. The alcohol separates mainly albuminous matter, while the extract retains a considerable quantity of acid phosphate of calcium, readily recognizable under the microscope. The strong acid reaction of the extract, however, led to the conclusion that another acid was present. The solution of the extract was, therefore, treated with milk of lime in slight excess, the liquid filtered from excess of lime and precipitated phosphate of calcium, evaporated and mixed with dilute alcohol, by which a precipitate of *lactate of calcium* was formed. This proves the presence of lactic acid as the source of the strong acid reaction of the extract, and explains why *mycose* is so often not found in it, since the latter is converted into lactic acid by the action of the gluelike substance (ergotin). The filtrate from the lactate of calcium was concentrated, the residue redissolved in water, the solution treated with solution of subacetate of lead as long as a precipitate was produced, again filtered, the excess of lead in the filtrate removed by carbonate of ammonium, and concentrated to syrupy consistence. The greater part of the acetate of ammonium formed is dissipated during the evaporation. The syrupy liquid deposited on standing an abundance of a granular substance, which, when purified, proved to be *Leucin; Tyrosin*, which very often accompanies leucin, was not found. From the syrupy residue the acetate of ammonium still remaining was removed by treatment with lime, precipitation of acetate of calcium with oxalic acid, solution in dilute alcohol, and precipitation with ether, and the active constituent in question thus obtained in a nearly pure condition.

Buchheim's Ergotin resembles, as has been before stated, animal gelatin most closely. Like gelatin, it is precipitable by phenylic acid and by tannin, but the latter does not precipitate it completely. It is more soluble in alcohol than is gelatin, from which it is further distinguished by its decided hygroscopic characters. It is also precipitable from its solution by gaseous chlorine; but while the precipitate so obtained from gelatin is, by the addition of ammonia, split into chloride of ammonium and unchanged gelatin, in the instance of ergotin it has undergone certain modifications, and then possesses characters which relate it, or possibly identify it, with the ergotin of Wiggers. When the aqueous solution of the author's ergotin is exposed to the air, additional quantities of leucin are deposited, leucin being evidently among the final products of its decomposition.

The author concludes that the substances which in healthy rye would have formed gluten, are by the action of the *Ergot mycelium* converted into a series of substances which are continually changed, the one into the other, until, as final products, *Leucin*, *Ammonia*, and *Trimethylamin* are formed. To this peculiar decomposition the activity of ergot is doubtless due, and it must, therefore, be ranked among the putrefactive or septic group of substances, which have hitherto been known only as disease-producing, and not as remedial agents. The continual change which occurs in ergot—in substance as well as in the form of its various preparations—precludes the possibility of obtaining from it a preparation that will remain constant in activity.

Active Constituents.—Dragendorff has communicated to the Pharmaceutical Society of Great Britain, some preliminary notices of an analysis of ergot of rye, made in conjunction with Padwissotzky, which give further light on the nature of the active principle or principles, and which, while much more comprehensive than the experiments of Buchheim, are perfectly conformable with the latter's results. Coming specially under consideration as an active constituent is:

(*a.*) *Scleromucin*, a slimy substance, which goes in solution upon extraction of the ergot with water, and which is again precipitated by 40 to 45 per cent. alcohol. It is colloidal, and after being once dried is with difficulty soluble in water. It contains nitrogen, but gives no albuminoid reaction, nor a reaction of an alkaloidal or a glucosidal body. There also occurs 2 to 3 per cent. of a substance,

(*b.*) *Sclerotic Acid*, which is similarly soluble in water, and also in cold 45 per cent. alcohol, and in boiling 75 per cent. alcohol, but precipitated by 85 or 90 per cent. alcohol. It possesses faint acid properties, and in its pure state is colloidal, but in the impure state possesses colloid septa. It also contains nitrogen, and yields no reactions by which albuminoidal, alkaloidal, or glucosidal properties could be inferred. As this substance is soluble in water after drying, and possesses, moreover, energetically the therapeutic action of ergot, it is recommended most strongly for therapeutic use.

Besides these decidedly active substances, the authors have obtained:

1. A red coloring matter, which they have named *Sclererythrin.* It exists in very small quantity, and is probably not entirely inactive.

2. A coloring matter similar to the above, which has been named *Scleroiodin*, is probably a decomposition product of Sclererythrin, and, like it, slightly active.

3. A colorless crystalline substance, *Sclerocrystallin.*

4. A yellow crystalline substance, *Scleroxanthin*, which is a hydrated compound of Sclerocrystallin.

5. Another yellow coloring matter, not obtained sufficiently pure to define its character.

6. A brown resinous substance, also not obtained pure, but which (like 5) seems not to be poisonous on frogs.

The authors have isolated Wenzel's *Ergotina* and Ecbolina, which they have found almost inactive upon frogs, and which are probably identical. Moreover, by Wenzel's method, they are not obtained quite pure.

Tanret's Ergotinin was also obtained by the authors, but they have not been able to come to the conclusion that it represents a chemically distinct substance. They found in it admixtures of their sclererythrin and other substances. Ph. J. Trans., June 17th, 1876, p. 1001.

H. Ducros recommends that ergot be kept in glass-stoppered bottles covered with a copious layer of powdered wood charcoal. The ergot keeps well, and the charcoal is readily removed from the drug when it is wanted for use by dusting or rubbing between a cloth. The author has so preserved ergot for many years. Zeitsch. Oest. Ap. Ver., No. 1, 1876, p. 8.

A. Stephen Wilson contributes an interesting paper on his observations and experiments upon the growth of ergot on various grasses, his observations relating mainly to the ergots infesting certain grasses in parts of Aberdeen and Kincardine. The grasses which are most usually ergotized in the district referred to, are:

Triticum sativum, L.; *T. repens*, L.; *Secale cereale*, L.; *Hordeum distichum*, L.; *Anthoxanthum odoratum*, L.; *Nardus stricta*, L.; *Alopecurus pratensis*, L.; *Phalaris arundinacea*, L.; *Phleum pratense*, L.; *Aira cæspitosa*, L.; *A. flexuosa*, L.; *Holcus mollis*, L.; *H. lanatus*, L.; *Arrhenatherum avenaceum*, Beauv.; *Poa pratensis*, L.; *P. annua*, L.; *Glyceria fluitans*, R. Br.; *Dactylis glomerata*, L.; *Festuca elatior*, L.; *F. pratensis*, Hudson; *Lolium perenne*, L.; *L. temulentum*, L. The author is at a loss to account for the special association of ergot with rye, since in the localities above named, ergot is nearly as rare upon rye as it is upon barley. Those grasses most commonly liable to ergot, are, Glyceria fluitans, Lolium perenne, Phleum pratense, Holcus mollis, Anthoxanthum odoratum, and a few others. The author's paper treats of the relation of ergotization to season, the mode of its dissemination, its relation to climate, its various forms, artificial ergotizing, the question of variety in species of ergot-fungus, its growth, its relation to the structure of the flower, and finally the effect of the ergot on the grasses which it infests. Ph. J. Trans., Jan. 1st, 8th, and 15th, 1876; from Gardner's Chronicle.

Agaricus albus—Composition.—G. Fleury has recently determined the components of agaric, as follows: water, 9.2 per cent.;

resin, soluble in ether, and agaric acid, 60.584 per cent.; resin with sulphate of magnesium, 7.282 per cent.; resinous matter with lime and magnesium salts, 2.514 per cent.; nitrogenous matter with salts in preponderance, 1.9 per cent.; oxalates, malates, and phosphates of iron, magnesium, and calcium, 1.058 per cent.; nitrogenous substance, soluble in potassa, 7.776 per cent.; insoluble residue of fungin, 9.686 per cent. The substances were isolated by successive treatment with ether, alcohol, cold, boiling, acidulated, and alkaline water. Arch. Ph., April, 1876, p. 362; from J. de Ph. et de Chim.

FILICES.

Aspidium Marginale, *Willd.*—The close resemblance and near relation of this plant to *Aspidium Filix-mas*, seems, according to the experiments of J. L. Patterson, to extend also to its proximate constituents. The plant abounds on rocky hillsides, in rich woods of Central Pennsylvania, and is readily mistaken for male fern. The rhizome, collected by the author in September, yielded besides tannic acid, cane-sugar, glucose, gum, and albumen, an oleo-resin, of acid reaction, which upon standing several weeks deposited yellow crystals of impure *filicic acid*. These, when properly purified by washing with ether, ether-alcohol, solution in diluted alcohol and carbonate of potassium, decolorization with animal charcoal, precipitation with HCl, and recrystallization from ether, possessed the reactions and properties of Luck's filicic acid from Aspidium Filix-mas. It is, therefore, probable that an oleo-resin, prepared from the rhizome of this species of aspidium, has identical physiological properties with that of the true male-fern, and experiments to determine this are being made. A. J. Ph., 1875.

GRAMINACEÆ.

Lolium Temulentum.—The poisonous character of the seeds of this member of the Graminaceæ, commonly known as the "bearded darnel," has given the incentive to a number of investigations, which are reviewed by Dr. C. G. Wittstein, in connection with some experiments made by him some years ago, with a view to isolating the poisonous principle. These experiments are now published in order to point out the difficulties attending the isolation of this principle, and to facilitate the labor of others in this direction.

The first analysis of the bearded darnel seems to have been made by L. F. Bley, in 1834, who found the seeds to contain traces of volatile oil, 7.5 per cent. chlorophyll, 3.5 per cent. soft resin, 6.0 per cent. bitter extractive associated with chlorides and sulphates, 6.0 per cent. gum associated with chloride of calcium, 0.7 per cent. sugar, 0.65 per cent. albumen, 1.55 per cent. extractive associated with malate of calcium, starch, gluten, vegetable fibre, etc., etc. The poisonous component was not positively determined, but seemed to be acid in its character, unpleasantly bitter to the taste, non-volatile, and soluble, both in water and in alcohol. In 1837 Muratori obtained, along with some of the above-named substances, a green oil, a resinous substance, and 1 per cent. of a peculiar acid, and to the latter, which is not volatile, he attributed the poisonous character of the seeds. In 1853 Schwerdtfeger examined the starch of Lolium seeds microscopically, and found the granules to be about one-third the size of those of wheat starch, perfectly circular, with moderately wide margin, and bright, strongly translucent surface without marks. These characteristics of the Lolium starch correspond with those since observed by Wittstein, who by his experiments became satisfied that the poisonous characters of the seeds are not due to an acid body, nor to a base, but to an indifferent body, which is incapable of forming compounds with lead or zinc, and may be completely extracted from the seeds by water or alcohol, and only incompletely by ether. The want of a further supply of material prevented the author from continuing his experiments, which he seems not to have since resumed; but he draws attention to the results of H. Ludwig and L. Stahl, who, subsequent to his experiments, in 1864, published the results of their investigations upon this subject in Archiv der Pharm. (cxix, p. 55), and who regard the poisonous components of the bearded darnel to be an acrid fixed oil and a glucoside. The latter, as obtained by them, was yellowish, bitter, and amorphous, and was split by the action of acids into glucose and a volatile acid. Zeitschr. Œst. Ap. Ver., No. 28, 1875, p. 449.

PALMACEÆ.

Copernicia Cerifera.—In his report on the trade and commerce of Brazil to the British Parliament, Consul Morgan gives the following interesting information in regard to the carnauba tree:

Amongst the most useful trees in Brazil is the Carnauba; a palm tree which, without any culture, develops itself in Ceara, Rio Grande do Norte, Bahia, etc. It resists the most prolonged drought, and preserves itself constantly luxuriant and green. Its roots possess the same medicinal effects as sarsaparilla. From the trunk are obtained strong fibres which acquire the prettiest lustre, as well as corner-pieces of timber, and excellent palisades for inclosures. The palmetto top, when young, serves as an appreciable and nutritious food; and therefrom also wine, vinegar, and a saccharine matter are extracted, as well as a kind of gum (?) similar in its taste and properties to sago. The trunk serves a great variety of purposes, a species of flour similar to maizena as well as a liquid resembling that of the Bahia cocoanut being extracted. The delicate fibrous substances of the pith of the stalk and its leaves make a good substitute for cork. From its dried straw (from the leaves?), mats, hats, baskets, and brooms are made, and of this straw large quantities are exported to Europe to be used in the manufacture of hats. The pulp of the fruit is of an agreeable taste, and the nut, oily and emulsive, is, after being roasted and reduced to powder, used as coffee by many persons in the interior. Finally, from its leaves is produced the wax used in the manufacture of candles, which has an extensive consumption in the northern provinces, especially Ceara. The annual exportation of this wax is calculated at 871,400 kilograms, valued at over £162,500. Ph. J. Trans., March 18th, 1876, p. 745.

LILIACEÆ.

Allium.—Garlic was used in ancient times in Greece, and has preserved its reputation to the present day, for culinary and medicinal purposes. The bulb was originally used as a prophylactic against witchcraft and enchantments, and godfathers attached it to the bodies of babes named after them. The species of allium cultivated in Oriental countries are: *Allium sativum*, *A. subhirsutum*, *A. descendens*, *A. porrum*, *A. Schœnoprasum*, *A. cepa*, and *A. Moly*, the latter having been extensively used as a protection against the evil influences of the renowned enchantress, Circe. The onion is largely consumed in the Orient, together with bread; it forms the principal nourishment of the poorer classes, and, with grapes, tomatoes, olives, and wine, it constitutes the sustenance of thousands of travellers in the summer-time. Prof. X. Landerer, in A. J. Ph., May, 1876, p. 193.

Asphodelus Racemosus and *Bulbosus.*—These interesting plants have been known from the remotest time, and being found in cemeteries, were consecrated to Persephone and the divinities of Hades. Pythagoras called the plant "pancration," a plant governing all, or possessing all properties. This name was adopted by Linnæus for *Pancratium maritimum*, which grows near the seacoast, and the bulb of which is not unfrequently exported as an admixture of squill. The principal use of asphodelus in ancient times was against the bites of venomous snakes, insects, and scorpions, and in inflammation of the testicles. In Turkey, a strongly adhesive substance is prepared from the bulbs, by exsiccating them thoroughly in suitable ovens, when they acquire the glutinous properties of dextrin, and are used as a paste by bookbinders and shoemakers. Prof. X. Landerer, in A. J. Ph., May, 1876, p. 193.

IRIDACEÆ.

Saffron.—An interesting paper on the cultivation of saffron in the Abruzzi was read by H. Groves, of the British Pharm. Conference, at its meeting in 1875. The cultivation of saffron has been carried on for many generations on the lower spurs of these mountains, at an elevation of from 2000 to 3000 feet. The ground being prepared in August with animal manure, preferably that of sheep, it is ready for the planting of the bulbs in the following October. The bulbs are planted in ridges, with intervening furrows, which, for economy of soil, are sown with corn, as this crop is gathered before the saffron flowers appear, and the furrows remain as pathways for the gatherers; besides which they are so disposed as to drain the plot. Each ridge is about half a metre in width, and is planted with four or five rows of bulbs, which are placed so as to touch each other longitudinally, and are planted at a depth of ten centimetres, so that they are just covered with earth. Nothing now remains but to keep the ground well weeded, and in the latter part of October and the whole of November the crop is gathered. For one season the bulbs will give out flowers, when placed in a moist place, even without earth. The gathering is done in the early morning, chiefly by women, who have wicker baskets on their arms, and pass along the furrows plucking the whole flower, which is carried home, and the stigmata removed at leisure. Several flowers, in some instances as many as ten or twelve, grow from one bulb. The saffron plot remains good for two years; in the third year the plots are planted with a crop of corn, and they may then again be planted with bulbs. When the old ground is dug up the bulbs first planted are wasted, and only the reticulated tunics remain, by the side of which are found the new bulbs. These are selected at home, the larger ones for replanting, the smaller ones as fodder for the cows. The author also draws attention to some methods of adulteration, among which that of shredded beef, prepared by boiling suitable pieces of beef, shredding it into small fibres, and staining these with saffron-water, is the one chiefly practiced. Ph. J. Trans., September 11th, 1875, p. 215.

MUSACEÆ.

Musa Fehii.—According to B. C. Niederstadt, the juice of the young trees, growing on Tahiti, abounds in a coloring matter, which may possibly be used for dyeing and other purposes. The liquid, as produced on the island, is of syrupy thickness and quite sticky; is neutral to test-paper, appears raspberry-red in thin layers and in thick layers blue-violet; exposed to the air, it loses its color and becomes mouldy, but may be kept unchanged for months if it is kept in well-stopped bottles filled to the neck, depositing during that time, however, some caoutchouc-like matter. The liquid from which the caoutchouc has been removed may be mixed with alcohol or water in all proportions, and is so intensely colored that when diluted with five volumes of water no apparent change in its intensity is observed. Its taste is strongly astringent, the coloring matter existing evidently combined with tannin. Its color is changed to green by alkalies; lime salts precipitate the tannic acid together with all the coloring matter; weak acids give the color a red tint; iron salts, especially the sulphate of the sesquioxide, produce a handsome blue precipitate; zinc and copper salts change the color of the liquid to blue, without producing a precipitate, but acetate of lead produces a violet-blue precipitate. The liquid, when reduced with five volumes of water, will dye cotton, which has been saturated with alum, faint grayish-violet; but with muriate of tin as mordant, a splendid violet is produced. By subjecting the last-named to a tin bath, and then to iron mordant, a rich dark-brown color is given to the goods. Ch. Centr. Bl., No. 8, 1876, p. 126.

AMOMEÆ.

Ginger.—S. A. D. Sheppard communicates to "The Laboratory" (March, 1876, p. 57), some historical notes on ginger, which will be read with interest, but are unsuited for extraction.

MARANTACEÆ.

Arrowroot.—Calmberg had found that arrowroot, some samples of which were of undoubted genuine quality, failed to respond to the test of the German Pharm., all of them gelatinizing almost immediately when the muriatic test was applied (see Proceedings, 1875, p. 136). Prof. E. Schaer has repeated the experiment with thirteen varieties of arrowroot and other starches, and has found that not only the starch from maranta, but also that of manihot may, under certain conditions which are as yet unexplained, show an entirely different behavior with muriatic acid. The following are the results obtained with the genuine starches as enumerated, when the muriatic acid test of the Pharm. German. was accurately applied:

a. *Potato-starch;* formation of jelly in a few minutes; perfect solution in a few hours; *decided cabbage* or *bean-like odor.*

b. *Wheat-starch;* no jelly formed; after a few hours a strongly opalescent solution.

c. *Brazilian arrowroot*, from *manihot;* reacts like *a.*

d. *Arrowroot*, from *maranta;* formation of thick turbid jelly in 5 minutes; on standing gradually becomes liquid.

e. *Port Natal arrowroot*, from *maranta;* reacts like *d.*

f. *West India arrowroot*, from *maranta;* formation of tolerable thick, turbid jelly after 10 minutes; gradually becomes liquid.

g. *Bermuda arrowroot*, from *maranta;* reacts like *d.*

h. *Jamaica arrowroot*, from *maranta;* no gelatinous formation, but a powdery deposit after 10 minutes; only partial solution after 24 hours and longer.

i. *Parkhill arrowroot*, from *maranta;* reacts like *h.*

k. *East India arrowroot*, from *manihot;* reacts like *h.*

l. *St. Vincent arrowroot*, from *maranta;* reacts like *h.*

m. *India arrowroot*, from *curcuma;* reacts like *h.*

n. *Java arrowroot*, from *maranta;* reacts like *h.*

Regarding the reaction which takes place with those starches that afford a jelly by the action of muriatic acid, the author believes it to be similar to that described by Flückiger, and by Flückiger and Hanbury, which takes place when they are acted upon by bromide or iodide of potassium, chloride of calcium, nitrate of sodium, and other readily soluble salts. As in these, the acid first swells the granules and gradually effects complete solution. The solution formed may be diluted with water so as to form a clear liquid, from which, however, the starch may be precipitated by alcohol in an unchanged condition, neither sugar nor dextrin being formed. The cause of the different behavior of the starches from the same plant with muriatic acid, the author has not succeeded to explain satisfactorily. Flückiger had ascribed it to a difference in the amount of hygroscopic moisture, as far as the different behavior of starches to saline solutions was concerned; but Schaer does not think that this difference can have much influence, since two samples of arrowroot, one of which formed a jelly while the other did not, contained respectively 12.6 and 13.0 per cent. of hygroscopic moisture. For the present the cause for the difference must be sought in climatic influences and variation in the process of preparation. Arch. Ph., August, 1875, pp. 97–103.

Natal Arrowroot.—T. Greenish read an interesting paper to the British Pharm. Conference, in which he draws attention to some microscopic characters of Natal arrowroot, which distinguish it from other arrowroots of *Maranta arundinacea*, while it is evident that Natal arrowroot is produced from the same plant. These distinctive characters have already been drawn attention to by Wiesner, but he had remained in doubt as to its origin or botanical source. Comparative experiments made with Natal, Bermuda, and St. Vincent arrowroot, show also that the granules of these different starches "swell," "burst," and "lose all shape" at varying temperatures. Natal arrowroot at 55° C. (= 131° F.) being equally affected with Bermuda at 60° C. (= 140° F.), and St. Vincent at 65°C. (= 149° F.). The peculiarities referred to in the author's paper have been the source of error in the diagnosis of starches. It forms an interesting subject for further investigation to determine the reason for such difference in the starches of the same plant grown in different localities. Ph. J. Trans., September 11th, 1875, p. 204.

ORCHIDACEÆ.

Vanilla.—F. Tiemann and W. Haarmann have recently communicated a method for the quantitative determination of vanillin in vanilla, by which they have determined that the percentage of this aromatic principle varies between 1.5 and 2.5 per cent. *Mexican vanilla* of prime quality was found to contain 1.69 per cent.; *Bourbon vanilla*, 1.91 and 2.48 per cent., and *Java vanilla*, 2.75 per cent. The vanillin in the Bourbon and Java vanillas is associated with an unpleasantly odorous volatile oil, for which reason the Mexican variety, notwithstanding its inferiority in the quantity of the aromatic principle, is preferred, and commands a better price. The following is the method pursued, and recommended by the authors as accurate: Finely sliced vanilla is extracted with ether until the residue is perfectly odorless and tasteless. The ethereal solution is partly evaporated, and is then agitated with a mixture composed of equal volumes of water and saturated solution of sulphite of sodium; the yellow ethereal solution is decanted and again shaken with solution of sulphite of sodium. The colorless aqueous solutions contain all the vanillin in combination with the sodium salt, from which it is liberated by the addition of sulphuric acid. Upon careful heating the liberated sulphurous acid is driven off without loss of vanillin, which is then removed from the solution by agitation with ether, and is obtained pure by carefully distilling off the ether at 50° to 60° C. (112° to 130° F.). It is finally dried over sulphuric acid until it no longer loses weight, and is then weighed. Ph. Centr. H., 1875, No. 47, p. 395.

ARISTOLOCHIACEÆ.

Asarum Canadense.—The highly aromatic properties of Canada snakeroot would seem to make it a desirable substitute for many of the more expensive aromatics now used in medicine, and its value in this direction has at various times been brought to the notice of the profession. Albert H. Van Gorder thinks that it is not more generally used, owing to the want of suitable pharmaceutical preparations, and he has made experiments with a view of determining the most suitable methods of making some of these. He concludes from his experiments that the rhizome contains besides the volatile oil, a second volatile ingredient, which is distinct from the volatile oil in its odor. The identity of such a volatile principle is, however, by no means established; the author basing his opinion on the distinctly different odor of a soft resinous substance, obtained from the residues in the still after the distillation of the oil. The latter corresponds to the description given by Rushton and by Procter, and amounts to 2 per cent. of the root employed. The activity of the drug is represented by the oleo-resin, which contains the volatile and resinous principles, about 10 per cent. of the weight of the root employed being obtained by exhausting the No. 40 powder with stronger ether. Fluid extract, tincture, and syrup, as recommended by the author, will be found under their proper headings in this report. A. J. Ph., April, 1876, p. 154.

LAURACEÆ.

Laurus Nobilis.—This handsome tree is met with in the forests of Greece, and is extensively cultivated in the gardens of cloisters. The seeds resemble those of the olive, and might, according to X. Landerer, be utilized for obtaining the highly aromatic fixed oil, which he has often expressed, and found more aromatic than the same oil from other localities. It seems as if in warmer climates the aromatic principles of plants are more profusely developed. like the bitter and astringent principles in colder regions. In ancient times the tree was consecrated to Apollo, and is hence called Laurus Apollonis. A. J. Ph., December, 1875, p. 535.

Camphor.—Preparation in Japan.—A. v. Roretz communicates the following information regarding the production of camphor in Japan. The plant producing the camphor that finds its way into commerce from Japan as well as Formosa, is *Laurus camphoratus*, which is very widely distributed over the Japanese Islands, but thrives best in the southern portions of the empire, especially in the province of Josa and on the island of Sikok. The method of obtaining the camphor is quite simple. The tree being felled, the trunk as well as the large roots and branches are chopped into small chips, which are then subjected to a crude process of distillation, during which the steam passing through them carries over the camphor and volatile oil. The crude camphor from which the oil has been drained is packed in barrels for export. It is never exported in a purified condition. The oil is used by the poorer classes, notwithstanding its strong odor and sooty flame, for illuminating purposes. Ch. Centr. Bl., No. 6, 1876, p. 94; from Pol. J., 218, 450.

POLYGONACEÆ.

Polygonum Amphibium; a plant which grows luxuriantly in the West, has been analyzed by Prof. Aughey, of the University of Nebraska, and is shown to contain in the roots 21.75 per cent. of tannin, and in the stems 17.10 per cent. Sumac yields about 16 per cent. and bark from 8 to 12 per cent; hence it is believed that the cultivation of the plant, which yields from three to six tons to the acre, may become of great importance to the West. It is said to be capable of producing all kinds of leather. The Laboratory, July, 1875, p. 90.

Rheum Officinale, Baillon.—In the Proceedings for 1873 (page

211), the successful cultivation of a species of rheum, claimed to be the species from which our supplies of Chinese rhubarb are obtained, has been referred to, and the description of the plant, by Prof. Baillon, given. Since then specimens of the plant have been successfully cultivated in various botanical and private gardens of Europe, and among these the plant has flowered in the garden of the Pharmaceutical Institute of the University of Strassburg, where Prof. F. A. Flückiger has had opportunity to observe it. Fig. 17 is a correct illustration of this plant, which corresponds in the main to the description of Prof. Baillon above referred to. Prof. Flückiger adds that the flower stems attained nearly their full height from the 20th to the 25th of May. The flowers began to open on the 27th of May, and were in full bloom on the 9th of June, the flowers being, however, white, and not "pale greenish," as described by Baillon. The germ had attained its full size by the 20th of June, the flower withered on the 26th of June, and the stems had then attained their full size, 2½ metres. Most of the little fruits were ripe by the 20th of July, but their number was small compared to the quantity of flowers. Neither the flowers nor the fruits were distinguishable from those of other species of rheum. The author has carefully examined the roots of Rheum officinale cultivated by himself; some that had been cultivated in the garden of the Ecole Supérieure de Pharmacie of Paris, and some that had been cultivated, and carefully prepared by Messrs. Rufus Usher & Sons, of Oxfordshire, in the manner in which they prepare their well-known rhubarb for commerce, and he arrives at the conclusion, that the root of Rheum officinale, Baillon, undoubtedly possesses the characteristics of genuine Chinese rhubarb. He sums up as follows:

1. In *Rheum officinale* we possess for the first time a plant, the root of which corresponds with true rhubarb.

2. This variety grows in Thibet, the northeastern portions of which have formerly yielded rhubarb, but do not now, it seems, produce any.

3. Whether rhubarb occurs in the provinces of Sintschuan, Schensi, Kansu, and from which of the provinces rhubarb is originally derived, remains to be determined.

4. Our knowledge of *Rheum palmatum*, var. *tanguticum*, is likewise still deficient; officinal rhubarb formerly came from the extensive provinces named under 3, sometimes entirely overland, at

Rheum officinale. *Baillon.*

Fig. 17.

To face page 130.

others *via* Canton, Ormuz, Syria, Asia Minor, or Southern Russia, and thence by sea, according to the political relations of the country.

5. Since China has been more generally opened to commerce, the drug finds its natural way to Hankow, the chief market of the interior, and thence by river to the sea. N. Rep. Ph., No. 1, 1876, pp. 1–18.

William Saunders had formerly supposed that the insects attacking rhubarb root were the same kind usually found in drug stores, but on rearing some he had found it to be a different species, which was new to him, and which he intends to investigate further. Proceedings, 1875.

Raiz del Indico.—This name is applied by the natives of Mexico to a plant growing along the Rio Grande, the root of which is used by them as an astringent. R. F. G. Voelcker had planted some fresh roots in 1874, and succeeded in raising some plants, which appear to belong to the Polygonaceæ, but not having yet flowered he is unable to positively classify the plant. He describes the roots as fleshy and fusiform, several of them growing together from a short head. They are nearly circular, one to two inches in diameter, and about two and one-half to three inches long. The corky bark is covered with a brownish, wrinkled layer, and is separated by a dark cambium line from the pithless internal substance, which is of a yellowish-brown or pinkish color. A transverse section of it shows one, or sometimes two yellow concentric rings, and many dark resinous spots, arranged so as to form radiating lines. The leaves of the plant are petiolate when full grown, with a stipule at the base of the petiole, entire, twelve to thirteen inches long by two and one-half to three inches wide, oblanceolate, acute, smooth, shining, juicy, and of a light green color. An examination of the root proved it to contain chrysophanic acid, aporetin, phæoretin, tannin, glucose, gum, starch, albumen, and oxalate of calcium. The leaves contained malic and oxalic acids, in combination with lime. The tannin in the root, estimated with a standard solution of gelatin, amounted to 23.16 per cent. A. J. Ph., Feb. 1876, p. 49.

PLANTAGINEÆ.

Plantago Isphagula, Roxb.—The curious little boat-shaped seeds of this plant, known as spogel seeds, are remarkable for yielding an abundance of tasteless mucilage, and in the proportion of two drachms to the pint form a useful demulcent drink in catarrh and renal affections. In chronic diarrhœa they are taken in the entire state in doses of two and a half drachms, giving off, when taken in this way, a bland mucilage during their whole course through the intestines. The seeds seem well worth a trial. (J. M. at K.) Ph. J. Trans., August 7th, 1875, p. 101.

SCROPHULARIACEÆ.

Gelsemium Sempervirens.—E. M. Holmes communicates a paper on gelsemium sempervirens, which is chiefly compiled from American sources and, therefore, requires simple reference in this report. The paper is distributed over four numbers of the Pharm. Jour. and Trans. (December 18th, 1875; January 1st, 15th, and 29th, 1876), and is accompanied by an illustration (Jan. 1st, 1876) of the root as it occurs in the London markets. The author's paper covers the entire ground, giving very thoroughly its botanical, pharmaceutical, chemical, and therapeutical history, and will, therefore, be found very useful to students who may be particularly interested in the subject.

SOLANACEÆ.

Solanum Lycopersicum.—It appears, according to a communication of X. Landerer, that the tomato is as highly appreciated in the Orient as it is with us. He states, that by expressing the juice and concentrating it by evaporation in the sun, it may be preserved for a year, and when dried in an oven it will keep well for several years. The fruit is frequently salted, and may then be transported. It is also employed medicinally, the pulp, called *domata*, being considered of utility in gravel and against chronic rheumatism. A. J. Ph., December, 1875, p. 535.

Solanum Sodomeum.—G. Missaghi has separated from an extract of this plant a crystalline salt, which on examination proved to be an acid salt of *solania*, the acid being organic. The plant yields a much larger percentage of the alkaloid than is obtainable either from S. dulcamara, or S. tuberosum. Ch. Centr. Bl., No. 13, 1876, p. 198; from Gazz. Chim. Italiana.

Tobacco.—Culture in Ohio and in Pennsylvania.—The culture of tobacco in Ohio is the subject of a paper by Benjamin T. Creighton, from which it appears that the mode of cultivating the plant there differs from that given in the United States Dispensatory, which appears like that pursued in Virginia. John Alfred Witmer writes a similar paper on the culture of tobacco in Pennsylvania, but neither paper is suited for extraction in this report, and the reader is therefore referred to the original papers in A. J. Ph., June, 1876, pp. 253 and 256. It may be mentioned, however, that Mr. Creighton has determined the ash of the leaves of the Ohio plant, and finds the lower leaves to yield 18.4 per cent.; the middle leaves, 14.2 per cent.; the top leaves, 14.8 per cent. The leaves were, in each instance before incineration, dried and heated until they no longer lost weight. He believes that the higher averages usually obtained are owing to soil which adheres tenaciously to the bottom leaves.

Capsicum.—The existence of an alkaloid in the fruit of *Capsicum annuum* has been a subject of controversy at various times, and at one time the activity of the drug was ascribed to a basic principle. In Watt's Dictionary it is stated that *capsicine* is an alkaloid obtained from Spanish pepper, the fruit of *Capsicum annuum.* Attfield, in his Chemistry, page 444, gives *capsicine*, or *capsicia*, in his list of alkaloids, and adds that it is crystalline, and forms crystalline salts. J. C. Thresh has performed some experiments with the fruits now found in commerce (*Capsicum fastigiatum*), by which he proves conclusively that the acrid principle is not an alkaloid, and in a footnote states that he has isolated the active principle and hopes soon to communicate the particulars. He has, however, obtained a very small quantity of a liquid alkaloid resembling conia, which is capable of forming crystallizable salts. By using a larger quantity of material he hopes to obtain it in sufficient amount to admit of its being further examined. Contrary to the universal belief he found the seeds, after the removal of the pericarp, and thoroughly washing and drying them, to be entirely devoid of acridity or pungency; their taste being similar to dried beans. Ph. J. Trans., May 27th, 1876, p. 941.

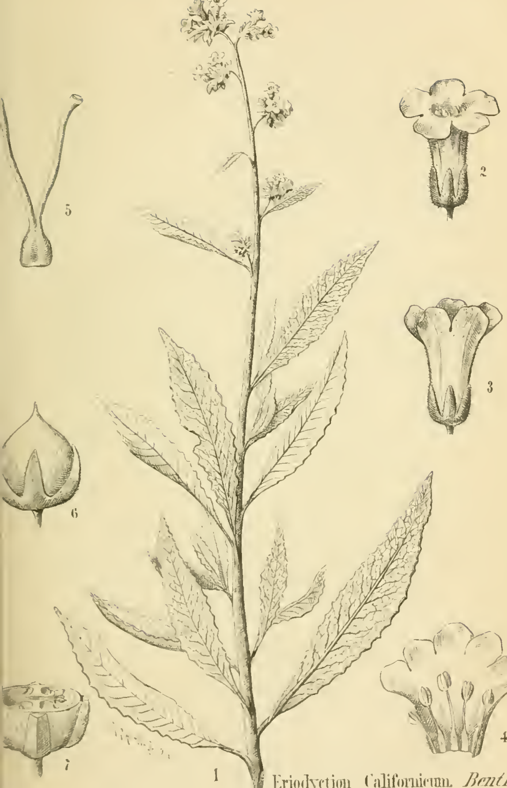
LABIATÆ.

Sideritis.—Among the plants which enjoy a great reputation in Greece are Sideritis theæzans, hirsuta, and several species, which, Landerer states, are largely collected in Macedonia, Thessalia, and near the Holy Mountain Athos, and are sent to Odessa. Thousands of persons drink in the coffee-shops, instead of Russian tea, the infusion of this plant with rum. It is very aromatic, and deserves to be introduced into medicine. The plant was known to the ancients as Sideritis achillea, and Plinius states that it was used for the healing of wounds. A. J. Ph., November, 1875, p. 499.

Salvia pomifera.—This plant, which derives its specific name, "pomifera," from small, apple-like excrescences, produced upon the plant by the sting of an insect, is frequently used in Greece for a variety of purposes, and is popularly known by the name of *Faskomylea.* Landerer states that it is used in cases of colds, and was formerly supposed to cure gangræna. The succulent galls, boiled with honey and wine-must, yield a confection which is relished by the poorer classes. A. J. Ph., November, 1875, p. 499.

HYDROPHYLLACEÆ.

Eriodyction Californicum, Benth.—This evergreen plant, which enjoys a reputation among the Spaniards and Indians of California as a *certain* cure for consumption, and is hence known as "consumptives' weed," although more generally known as "yerba santa," "mountain balm," and "bear's weed," is the subject of a paper by H. S. Wellcome. It has attracted the attention of the medical profession as a valuable agent in the treatment of pulmonary and bronchial affections. The plant is pervaded with abundance of a resinous body—the leaves yielding from 20 to 30 per cent.—which seems to be composed of several distinct resins. The plant abounds in many localities on the Pacific slopes, and is specially abundant on the mountain ranges of Northern Mexico and Southern and Central California. It grows thriftily among the rocks and in the most barren soils; the seeds germinate readily, from which the young plants spring up close together in dense bundles and patches, attaining a height of from 3 to 5 feet, usually branching near the earth, giving three to eight stems from one root. The latter is very tough and withy, and sends out long, slender rootlets. The leaves (see Plate, Fig. 1) are coriaceous, elliptical, lanceolate, finely dentate, rarely entire, petioled, alternate, one to three inches in length, frequently as many as three or four growing from one axil. The upper surface is glabrous, indistinctly reticulated; has a rich, deep-green color, and is completely varnished by its copious resinous excretion, rendering it very beautiful as it glistens in the sunshine. The under surface is covered with very fine white hairs, and exhibits a heavy midrib, with delicate ribs extending nearly to the edges, and is cut by an intricate network of prominent veins, which are traced, as are also the ribs, with a resinous exudation.



Eriodyction Californicum. *Benth.*

Figs 2 and 3 Flower, Fig 4 Corolla open, Fig 5 Pistil, Figs 6 and 7 Capsu

Figs. 18 24.

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This secretion is first presented upon the second leaves of the young plant, and as it develops the resin is exhibited on the whole plant.

The flowers (see Figs. 2, 3, 4) are light purplish-blue, and very showy, racemed, somewhat densely clustered, corolla funnel-shaped, five-lobed, style two-cleft, ten stamens included, and slightly hairy near the base. The ripe fruit (see Figs. 6, 7) consists of a grayish-brown, ovoid, one-celled capsule, with calyx still attached, having two parietal placenta, to which are attached twelve to twenty-four minute, irregular-formed, shrivelled, reddish-brown seeds, which are very rich in fixed oil. The capsule is saturated with an oil or resin, which gives it a semi-transparent appearance.

The leaves, when macerated in strong alcohol for an hour, yield a resin, which is amber colored, transparent, and highly aromatic in odor and taste; and by continuing the treatment with alcohol, a second resin, of a dark-green color, and bitter taste. An aqueous infusion of the dregs remaining from the tincture yields an intensely bitter extract.

A fluid extract or tincture may be prepared—the latter in proportion of four ounces to the pint—the proper menstruum being 75 per cent. alcohol; the dose of the fluid extract being one-half, and of the tincture one or two fluid drachms. A syrup of the resin may be made by triturating it with powdered French chalk, and following the process of the Pharmacopœia for syrup of tolu. Such a syrup has a delicious, fruity aroma and taste, closely resembling pineapple. The Pharmacist, February, 1876, p. 33.

CONVOLVULACEÆ.

Scammony.—Prunier has observed scammony which upon examination proved to contain 57 per cent. of starch. It contained but 28 per cent. of resin, which was completely soluble in oil of turpentine, while five-sixths was dissolved by alcohol and one-sixth by ether. Zeitsch. Œst. Apoth. Ver., April 1st, 1876, p. 156.

Cuscuta Epilinum (Toad flax) is a parasitic plant found upon Satureja and Thymus, the latter of which is frequently completely covered with it. It was recommended by Pliny in dropsical affections, and in Greece is still employed for this purpose, and also in angina and gouty complaints. Prof. X. Landerer in A. J. Ph., May, 1876, p. 194.

GENTIANACEÆ.

Gentian Root.—E. L. Patch, in a paper read before the Massachusetts College of Pharmacy, makes the statement that gentian root, contrary to the usual authorities, contains tannic acid, and bases this statement partly upon the incompatibility of muriated tincture of iron with compound tincture of gentian, amongst the ingredients of which is bitter orange-peel, which, in all probability, contains a tannin-like principle, and does produce a black coloration (*i. e.*, precipitation) with ferric salts. Am. Dr. Cir., February, 1876, p. 48.

In reply to the statement of Mr. Patch, Prof. J. M. Maisch communicates the results of his investigations, by which he proves very conclusively that gentian root contains no tannic acid, but that the yellow bitter principle, gentiopicrin, and the crystalline bitter principle, gentianic or gentisic acid, severally do produce colorations, and if sufficiently concentrated colored precipitates from their solutions, the color of the first being deep-brown, and of the gentisic acid precipitate dark brown-green. A. J. Ph., March, 1876, p. 117.

Erythræa Centaurium, which under the name "thermochorton," was used in the time of Hippocrates as a fever plant, is still used with marked success in the chronic fevers of Oriental countries; it is made into a strong decoction together with the leaves of the olive tree. Prof. X. Landerer, in A. J. Ph., May, 1876, p. 196.

APOCYNACEÆ.

Nerium Oleander.—This beautiful plant is called in Greece "rhododaphne," or rosebay, and "picrodaphne," or bitter bay. When taken internally (what part?) it nearly always produces nausea on account of its extreme bitterness; but, after long-continued use, it has been found to be of some value in epilepsy, by reducing considerably the frequency of the paroxysms, although not effecting a complete cure. Prof. X. Landerer, in A. J. Ph., May, 1876, p. 195.

Dita Bark (*Echites scholaris*, L., *Alstonia scholaris*, R. Brown). —Julius Jobst and O. Hesse have conducted a series of very thorough and interesting experiments upon the chemical constitution of dita bark, by which they arrive at conclusions differing very materially from those arrived at by Hildwein (see Proceedings, 1874, pp. 111 and 277), and recently by v. Gorup-Besanez. The latter, it is true, had obtained a very small quantity of a crystalline substance, which, it was stated, possessed all the characters of an alkaloid; but it remains an open question, whether this substance is contained in the bark as alkaloid, or whether it is a product of decomposition, as, in the opinion of the authors, the necessary precaution to prevent such change had not been observed. The sample of bark subjected to investigation was obtained from Mr. Gruppe, as had been that operated upon by Hildwein (and v. Gorup-Besanez ?). In contradiction to the observation of Hildwein, they find that the infusion of the bark is not deprived of its bitterness by the addition of subacetate of lead; indeed, its bitterness is but slightly affected by the latter, while phosphomolybdic acid produces a precipitate which contains substantially the bitter ingredient of the bark. The precipitate produced by subacetate of lead evidently contains a crystallizable acid, but it has not been obtained in sufficient quantity to permit its identification. The precipitate with phosphomolybdic acid contains an alkaloid which the authors have named *ditamina* (see Alkaloids, in this report). By extracting the powdered bark with petroleum ether, and evaporating the latter by the aid of boiling water, a glutinous mass remains, which, when purified by repeated boiling with alcohol, remains as an extremely elastic substance, and is named by the authors

Echicaoutchin (Echikautschin).—This, as obtained, forms a tough amber-colored mass, which becomes brittle at 0° C. (= 32° F.), and may then be reduced to a white powder. Upon heating, it softens and melts, and, at a sufficiently high temperature, is decomposed with formation of a volatile oil and sharp acid odorous vapors. It is readily dissolved by chloroform, ether, petroleum ether, or benzin (benzol ?); hot alcohol takes up mere traces; concentrated solution or melting caustic potassa do not affect it; hot concentrated nitric acid decomposes it; concentrated sulphuric acid blackens it. Its ultimate composition corresponds to the formula $C_{25}H_{40}O_2$ (O = 16). From the hot alcoholic washings of the above-named petroleum-ether residue the authors obtained four additional substances, which they have named *Echicerin*, *Echitin*, *Echiteïn*, and *Echiretin* respectively.

Echicerin crystallizes from boiling alcoholic solutions in loose stellate groups of small colorless needles, or in warty masses composed of needle-shaped crystals; it is sparingly soluble in cold alcohol, very readily by ether, petroleum ether, acetic ether, benzin (benzol), or chloroform, less soluble in aceton, and insoluble in water, solution of potassa, ammonia, or diluted acids. Its composition corresponds to the formula $C_{30}H_{48}O_2$ ($O = 16$). By the action of bromine on its solution in chloroform it is converted into *Bromechicerin* ($C_{30}H_{47}BrO_2$ ($O = 16$)). By the long-continued action of sodium upon its solution in petroleum ether, at a temperature of 60° C. (= 140° F.), and subsequent treatment of the product of the reaction, a fatty acid—echicerinic acid—is separated, and when purified by suitable means was found to have the composition $C_{30}H_{46}O_4$ ($O = 16$).

Echitin, which accompanies the echicerin very tenaciously, forms soft white leaflets, which are generally isolated, but occasionally concentrically grouped. It is readily soluble in hot alcohol, very sparingly in cold alcohol, much less soluble than echicerin in ether, aceton, or petroleum ether, but very readily dissolved by chloroform. It is perfectly indifferent, has neither odor nor taste, and is apparently inert. Its composition is $C_{32}H_{52}O_2$ ($O = 16$). By the action of bromine on its solution (in chloroform ?) it is converted into *Bromechitin* ($C_{32}H_{51}O_2$ ($O = 16$)).

Echitëin, owing to its greater solubility, remains in the alcoholic solution from which echicerin and echitin have separated. It crystallizes readily from alcoholic solution in the form of four-sided, sometimes six-sided, prisms, evidently belonging to the rhombic system. It is readily dissolved by ether and by chloroform, less readily by petroleum ether or aceton. Its composition corresponds to the formula $C_{42}H_{70}O_2$ ($O = 16$). Bromine, acting upon its chloroformic solution, converts it into *Bromoechitëin* ($C_{42}H_{67}Br_3O_2$). Finally,

Echiretin is obtained from the mother liquor from which echitëin has crystallized. It forms a transparent, brittle, resinous mass, which forms a white powder by trituration, is readily soluble in ether, petroleum ether, chloroform, boiling aceton, and hot alcohol; it is tasteless and neutral, does not combine with potassa or other bases, and is decomposed by concentrated acids. Its composition corresponds to the formula $C_{35}H_{56}O_2$ ($O = 16$).

The authors conclude, from their experiments, that dita bark is not likely to find application as a material for the production of commercial quantities of well-characterized alkaloidal salts for febrifuge purposes, even if its characters as a febrifuge are established, since it contains but sparing quantities of alkaloidal constituents. N. Rep. Ph., No. 2, 1876, pp. 76 to 106.

Asclepias Cornuti.—William Saunders has communicated a paper to this Association, from which it appears that the entire plant yields a caoutchouc-like matter, which is readily converted into vulcanized rubber. Experiments are being made with a view to utilizing the plant industrially. Proceedings, 1875.

Cortex Mudar.—This bark is furnished by two nearly allied species of *Calotropis.* It was probably in use in India prior to the Christian era, but was not investigated experimentally by Europeans until Playfair recommended the drug in elephantiasis, and its good effects were afterwards noticed by Vos (1826), Cumin (1827), and Duncan (1829). The last-named physician also made a chemical examination of the root-bark, the activity of which he referred to an extractive matter which he named *Mudarin.* Mudar is an alterative tonic and diaphoretic—in large doses, emetic. By the natives of India, who employ it in venereal and skin complaints, almost all parts of the plant are used. According to Moodeen Sheriff, the bark of the root and the dried milky juice are the most efficient. The older the plant the more effective is the bark, from which the outer corky coat should be removed, it being tasteless and inert; forty or fifty grains of the powdered bark being given as an emetic. The stems of one of the varieties, *C. gigantea*, afford a very valuable fibre, which can be spun into the finest thread for sewing or weaving. Dr. Cir., August, 1875, p. 140.

Tylophora Asthmatica, W. et A.—The leaves of this plant are regarded in India as one of the best indigenous substitutes for ipecacuanha, and are used in the form of powder for dysentery, and all catarrhal affections for which ipecacuanha is generally used. (J. M. at K.) Ph. Jour. Trans., August 7th, 1875, p. 101.

Nux Vomica.—The fixed oil of the seeds has, by F. Meyer, been determined to be composed of the Triglycerides of oleic, caprinic, caprylic, butyric, and palmitic acid, and of another acid containing 76.89 per cent. carbon, more than does stearic acid. Ch. C. Bl., No. 46, 1875, p. 727.

EBENACEÆ.

Diospryri Fructus.—This fruit grows abundantly in the neighborhood of Bombay, according to W. Dymock, and is there called "Timbooree." It is intensely astringent until quite ripe, when it suddenly becomes mawkish and sweet, without a trace of its former astringency. In preparing the extract of the unripe fruit (the inspissated juice is used as an astringent) it is necessary to avoid the use of iron or steel implements. The extract when finished has much the color and consistence of shellac. The ripe fruit is eaten by the poorer classes. The seeds are preserved by the country people, and given as an astringent in diarrhœa, the testa being the astringent part, while the albumen is almost tasteless. The leaves of the plant are used for folding cigarettes. The author describes the plant and its various parts. Ph. J. Trans, June 17th, 1876, p. 1002.

ERICACEÆ.

Ledum Palustre.—This plant, marsh tea or wild rosemary, is stated to afford an excellent substitute for Persian insect powder, and is recommended as such by a writer in Wochenschr. d. N. Œst. Gewerke-Ver. (16, 1875). It is a certain insecticide in the fresh as well as in the dry state, destroying readily lice, bed-bugs, fleas, moths, etc. A tincture prepared from the plant relieves the pain occasioned by the sting of gnats, and, when mixed with glycerin and rubbed upon the skin, keeps them away. It is most active in the fresh state, and should be gathered when in bloom. (See Volatile Oils.) Zeitschr. Œst. Ap. Ver., No. 21, 1875, p. 346.

COMPOSITÆ.

J. R. Jackson communicates some notes on the medicinal plants of the Compositæ. No natural order has such distinct botanical characters as have the Compositæ, and no other order, perhaps, with the exception of Leguminosæ, has so wide a distribution over the surface of the globe. The properties of the order also vary considerably, for while some species abound in a bitter aromatic principle others are tonic and stimulant, while others again abound in a milky poisonous juice. Among the remedial plants of this order, those of the genera *Artemisia*, *Vernonia*, *Notonia*, *Eupatorium*, *Solidago*, *Ambrosia*, *Blumea*, *Eclipta*, and *Liatris* are prominently considered. In the genus *Vernonia*, one of the largest of the Composite order,

Vernonia Anthelmintica, common in waste places throughout India, furnishes from its seeds by pressure a green-colored oil or fat. These seeds are seen in most of the Indian bazaars; they are of a brown color, and have a bitter nauseous taste; amongst the natives they are highly valued as an anthelmintic, being bruised and administered in honey, in doses of about a drachm and a half, divided equally and taken at an interval of a few hours, followed by an aperient. Their effect is said to be to expel the worms in a lifeless state. Dr. Gibson regards the seeds as a valuable tonic and stomachic; and besides this they are said to possess diuretic properties. Another Indian plant,

Notonia Grandiflora, has been advocated as a remedy for hydrophobia, and the Indian Pharmacopœia gives the following manner of preparation and administration: About four ounces of the freshly gathered stems, infused in a pint of water over night, yield in the morning, when subjected to pressure, a quantity of viscid greenish juice, which, being mixed with water, is taken as a draught. In the evening a further quantity of the juice, made into boluses with flour, is taken. These medicines are directed to be repeated for three successive days. A South American species of Eupatorium,

Eupatorium Ayapana, is used as an antidote for snakebites, both for inward and outward application. It is very aromatic, and has a slightly bitter and astringent taste. The plant is also used medicinally in Mauritius, and also in India, Ceylon, and Java, where it has become naturalized. The author's reference to the various species of Eupatorium indigenous to and in use in North America, brings nothing that is new to the American reader. The genus Blumea is remarkable for furnishing—from

Blumea Balsamifera—the peculiar camphor called Ngai Camphor, so well described by Mr. Daniel Hanbury (see Proceedings, 1875, p. 141). The plant is said to be in very general use in Java and China as an expectorant, and in Cochin China as a stomachic, antispasmodic, and emmenagogue. Ph. J. Trans., December 11th, 1875, p. 462.

Atractylis Gummifera, by the ancient Greeks called "chamaileon," is a handsome, thistle-like plant, yielding an exudation, which is collected by women and children, and sold as pseudomastich or acantho-mastich. The pieces, consisting of agglutinated tears, are oblong in shape and usually about two inches in length by one inch in thickness. Its root bears some resemblance to celery and parsnip, and is occasionally mistaken for these esculent roots. Four children were poisoned and died on the island of Melos, from eating the root of this plant, and another case occurred in the island of Mykonos. Prof. X. Landerer, in A. J. Ph., May, 1876, p. 195.

Sonchus Oleraceus.—The ancient name of this plant, sonchos, is derived from the Greek, signifying lifegiving. It has enjoyed a high repute for its medicinal properties among ancient authors, Theophrastus, Pliny, Dioscorides, etc., and has maintained its reputation in Greece to the present day, being greatly esteemed in diseases of the liver, particularly in jaundice. The plant is boiled and eaten with oil, and nursing women apply it in the form of cataplasms with the view of augmenting the secretion of milk. Prof. X. Landerer, in A. J. Ph., May, 1876, p. 194.

Cichorium Intybus.—R. Nietzki has subjected the flowers of the common chicory to chemical examination, and has determined, besides a fat containing butyric acid in combination with oxide of glyceryl and an amorphous bitter principle, identical with that contained in the roots, a crystalline glucoside. It was obtained in quantities by repeatedly boiling the dried flowers with 60 per cent. alcohol, distilling off the greater part of the alcohol, adding water, and evaporating any alcohol remaining. A considerable quantity of fat, separated upon the surface, was removed by straining, the liquid acidulated with acetic acid, treated with subacetate of lead, and filtered to remove a small quantity of a greenish precipitate formed. The clear liquid was then treated with sulphhydric acid, again filtered, evaporated to a syrupy consistence, allowed to stand twelve hours, the crystalline magma collected on a filter, washed with cold water—in which the crystals are nearly insoluble—to remove the mother-liquor, and purified by several recrystallizations from hot water. The yield amounted to about 4 per cent. of the flowers employed. The

New glucoside crystallizes with great readiness from hot aqueous solution, forming dazzling white needles united in stellate tufts. It is insoluble in cold, very readily soluble in hot water and alcohol, soluble with yellow color in aqueous ammonia, and, with elimination of carbonic acid, in aqueous solutions of alkaline carbonates. From its strong alcoholic solutions it does not crystallize readily, but from alcohol of 30 per cent., when exposed to spontaneous evaporation, it is obtainable in crystals nearly an inch long. On account of their sparing solubility in water, the crystals possess very little taste, but its hot solutions are intensely bitter. It contains 9.80 to 9.99 per cent. of water of crystallization, which it loses at a temperature of 120° to 130° C. (= 248° to 266° F.). By boiling with dilute sulphuric acid, it is split into glucose and a crystalline body, which approaches in its composition both rutin and quercetin, but is identical with neither. The author gives some of the properties of this new body, for which he gives the provisional formula $C_{20}H_{14}O_9$ ($O = 16$). For the glucoside he gives the formula $C_{32}H_{34}O_{19}$ ($O = 16$); but both of these substances require further investigation, with which he is still engaged. Arch. Ph., April, 1876, p. 327.

Erigeron Viscosum.—This plant, which is very abundant in Greece, is there used, according to Landerer, for the preparation of aromatic baths in various diseases of the urinary organs, and as a fumans for stupefying mosquitoes and other insects, for which purpose it is as efficient as Caucasian insect powder. Being very viscous before flowering, it is placed in the beds of children to attract the fleas, which adhere to it. A. J. Ph., November, 1875, p. 498.

Achillea Ageratum, L.—The entire plant, which abounds in various portions of Central Italy, is pervaded with a peculiar volatile oil, which has been obtained by De Luca by distillation with water, and subjected to examination. (See Volatile Oils, in this report.) The yield varies with the season, being most abundant immediately before flowering. The flowers are yellow, and very handsome, and the plant is therefore frequently cultivated in gardens. The odor of the plant, and consequently of the oil, is strongly aromatic and camphoracious. When the oil is distilled during the flowering period the quantity is very small, and the product is accompanied by a resinous and strongly odorous substance, which passes over with the vapor of water with difficulty. N. Rep. Ph., No. 6, 1875, p. 353.

Helianthus Annuus.—The common sunflower is cultivated largely in Hungary and the interior of Russia for the oil of its seeds, which is used largely for food, while the oil-cake furnishes an excellent food for cattle. The very profitable yield in oil, as well as the advantages which this plant seems to offer from a sanitary point of view,. in drying up marshy districts, seem to make its more general cultivation in some districts very desirable, and Dr. G. C. Wittstein has, therefore, undertaken a series of practical experiments, which may be useful to the cultivator. He finds that a Bavarian tagwerk (=3407 □ metres) is capable of producing 16,000 vigorous plants, which he calculates will weigh in the aggregate 1680 cwt., 80 cwt. of which is seed. The roots, leaves, stems, and flower-disks (deprived of their seeds) yield 1.9 per cent. of ash, which is very rich in potash; the calculated quantity, based upon the author's analysis, being 23 cwt. from the above quantity, or

75.5 per cent. of the whole quantity of ash. The plant being very rich in saltpetre, it burns readily after drying. The seed varies in the relation of hull to kernel between 41–60 per cent. of the former to 40–59 per cent. of the latter, and the percentage of oil between 16.25 and 28 per cent. On an average about 18 per cent. of oil may be obtained by expression, which, calculated for the 80 cwt. of seed, amounts to 14.4 cwt. per tagwerk. The author gives the result of his analysis of the ash of the seed and of the ash of the roots, stems, leaves, and flower-disks, as follows:

	Ash of the seed.	Ash of the roots, stems, leaves, etc.
Potassium, ...	. . . . .	3.676
Potassa, ...	14.475	44 011
Sodium, ...	1.405	1.092
Soda, ...	4.714	. . . . .
Lime, ...	6.811	9.851
Magnesia, ...	10 960	5 291
Alumina, ...	0.227	0.280
Oxide of Iron, ...	1.427	0 170
Chlorine, ...	2.162	5 004
Sulphuric Acid, ...	2.086	1.344
Phosphoric Acid, ...	31.848	6.968
Silicic Acid, ...	10.811	0.687
Carbonic Acid, ...	13 074	21.626
	100.000	100.000

Arch. Ph., April, 1876, pp. 289–293.

RUBIACEÆ.

Coffee.—Analysis of various kinds. O. Leverie has examined several varieties of coffee with the following results:

	Caffeia.	Fat.	Mucilage.	Caffeic and tannic acid.	Cellulose.	Ash.	Potassa.	Phosphoric acid.
	Perct.	Per ct.	Perct.	Perct.	Perct.	Perct.	Perct.	Perct.
Finest Plantation Jamaica,	1.43	14.76	25.3	22.7	33.8	3.8	1.87	0.31
" green Mocha, . . .	0.64	21.79	22.6	23.1	29.9	4.1	2.13	0.42
Pearl Plantation Ceylon, .	1.53	14.87	23.8	20.9	36.0	4.0	?	0.27
Washed Rio, ...	1.14	15.95	27.4	20 9	32.5	4.5	?	0.51
Costa Rica, ...	1.18	21.12	20.6	21.1	33 0	4.9	?	0.46
Malabar, ...	0.88	18 80	25.8	20.7	31.9	4.3	?	0.60
East India, ...	1.01	17.00	24.4	19.5	36.4	?	?	?

A slight inaccuracy in the above results is explained by the fact that a small quantity of fat adheres tenaciously to the caffeic and tannic acids, and is, consequently, calculated twice. The fat was determined by macerating the finely powdered and previously dried coffee in twice its weight of boiling petroleum ether for thirty-six hours, filtering, washing the residue until completely deprived of its fat, and then evaporating until the weight of the residue remains constant at 100° C. (= 212° F.) The determination of the mucilage direct was found impracticable; it was therefore determined as sugar, as follows: The powdered coffee was macerated with 4 parts of water for 36 hours, 12 parts of alcohol, of 90–93 per cent., added, and again macerated for 24 hours. The mixture was then thrown on a filter, the residual powder washed with alcohol, and then boiled for 8 hours with 50 parts of water and 2 parts of sulphuric acid, in a flask provided with a reversed condenser. The decoction was then filtered, and the liquid brought to the measure of 250 c.c. for every 2 grams of coffee used, by washing the residue on the filter. The sugar was determined by titration, and from the results so obtained the quantity of mucilage calculated. The alcoholic filtrate, as above obtained, served for the purpose of determining the caffeic and tannic acids. None of the samples contained sugar. Arch. Ph., April, 1876, p. 294.

Ipecacuanha.—Cultivation in India.—The latest report of Dr. King, the principal of the Royal Botanical Gardens at Calcutta, is not very encouraging in respect to the cultivation of *Cephaëlis Ipecacuanha* in India. A number of plants were put out during the early part of the year at different spots, at low elevation, in the Cinchona reserve at Sikkim; warm, well-sheltered situations, with good virgin soil, were chosen. Some of the plants were protected by the natural shade of the forest, others by a sloping thatch of grass. All went well until the arrival of cold weather, when the unusually low temperature that prevailed during the season was fatal to the majority of the plants. While further trials are not abandoned, Dr. King considers it doubtful whether ipecacuanha can be successfully cultivated as an outdoor crop in Sikkim. Ch. and Dr., Dec. 1875, p. 421.

Dr. Joseph D. Hooker, in his report on the Royal Gardens at Kew, for 1874, referring to the attempts made to acclimatize various plants in other than their native countries, says that the prospects of the ipecacuanha cultivation are far less encouraging than those of the cinchona cultivation. This arises not so much from want of success in establishing and increasing the plant as from the apparently extremely slow growth of the underground rootstock from which the drug is obtained, and the small yield of even a full-grown plant. Nevertheless, he considers the cultivation should be persevered in. Ph. J. Trans,, Sept. 11th, 1875, p. 204.

Cinchona.—Cultivation in the Isle de Bourbon.—The cultivation of cinchonas in the Isle of Bourbon is at present carried on altogether by private enterprise, the French Government having hitherto shown itself indifferent to the acclimatization of this valuable febrifuge. Dr. Vinson, one of the first to embárk in the enterprise, reports that the first seeds were obtained from Dr. Hooker in 1869, and that the trees raised from cuttings of the first seedlings have attained a height of twelve to eighteen feet in four years; the species under trial being *C. Calisaya* and *C. officinalis.* The bark of *C. officinalis* has been found to yield from 1000 grams, 14.3 grams quinia and 0.5 grams cinchonia; and Dr. Vinson thinks that the cinchona may be profitably cultivated. The young plantations have not suffered seriously by cyclones, as has been the case with the plantations in the Mauritius (see Cinchona Cultivation in Mauritius), but they seem to have a decided enemy in the enormous blue-green caterpillar of the oleander sphinx (*Deilephila Nerii*), which during a single day completely riddled and destroyed the large leaves of some of the trees. Ph. J. Trans., July 24th, 1875, p. 66; from Gardeners' Chronicle.

Cinchona.—Cultivation in Ceylon.—According to a report of Dr. Thwaite's, on the Botanic Gardens at Péradeniya and Hakgala, for 1874, it appears that no less than 826,000 plants of *Cinchona succirubra* and *C. officinalis* collectively have been distributed from the Hokgala garden during the year 1874. So great an abundance is there of stock plants from which suitable cuttings can be taken, that there is little probability of the supply falling short of the expected demand. The two above-mentioned varieties continue to be in best demand, as they are known to succeed so well, and are so easily propagated by cuttings. *C. Calisaya* is not readily propagated by cuttings, and recourse must be had to seedlings, which are not likely to be so constant in character as cuttings, owing to the chance of their turning out hybrids. Ph. J. Trans., July 31st, 1875, p. 86; from Gardeners' Chronicle.

Cinchona.—Cultivation in the Mauritius.—From a report of Dr. Small, the senior medical officer stationed in the Mauritius, some interesting details of the progress of the attempt to cultivate cinchona in that island is extracted in Ph. J. Trans. (July 10th, 1875, p. 21.)

A few years ago the culture of the cinchona plant on a small scale was begun at Curepipe. The plantations, since extended, have been fairly successful, and in time will doubtless prove of much importance to the colony. Of the four species originally brought from Ceylon, *C. Pahudiana*, *C. officinalis*, *C. Calisaya*, and *C. succirubra*, the last-named thrives best, the climate being too hot and the soil too heavy for the others. The young plants from either cuttings or layers thrive best; those from the seeds remain delicate for a long period. A chemical analysis of the red bark of C. succirubra, grown at Curepipe, was made by Mr. C. Bernard. The bark did not exceed three years, peeled badly off the trees, and was not well dried; while the trees had not yet become covered with moss as they are now; the appearance of the latter leading to the expectation of a greater yield of alkaloid. The following is the

Analysis: (1.) The sample consisted of small pieces of bark, varying in thickness from 1 to 4 millimetres, presenting on the inside a reddish orange tint, on the outside a brown color. The thinnest pieces of bark stripped from young branches were formed of the cellular tissue; the thicker pieces presented a notable proportion of liber; the skin was completely free from parasitical plants.

(2.) Under the microscope the pieces in question presented cells containing grayish crystals soluble in acid (kinates and kinovates of quinia).

(3.) The yield was then determined (1) in an average sample of the bark; (2) in the older bark to which the liber was attached; (3) in the younger bark to which no liber was attached; (4) in the older bark separated from the liber; (5) in the liber.

(4.) The several analyses were made upon quantities of 12 grams each, by the ordinary process by sulphuric acid and lime; were verified by further analysis made by Woehler's process by chlorhydric acid and ammonia; and the proportions obtained by the latter method accepted as the most correct, with the following results from 1000 parts:

No. 1. Average Sample.—Quinia 12.40 (= 16.52 cryst. sulphate); quinidia 7.74 (= 10.28 cryst. sulphate); cinchonia 8.52 (= 10.60 cryst. sulphate); total 28.66 (= 37.40 cryst. sulphates).

No. 2. *The Older Bark.*—Quinia 13.80 (=17.60 cryst. sulphate); quinidia 8.16 (= 10.90 cryst. sulphate); cinchonia 10.28 (= 12.82 cryst. sulphate); total 32.24 (= 41.32 cryst. sulphates).

No. 3. *The Younger Bark.*—Quinia 11.50 (= 15.36 cryst. sulphate); quinidia 6.39 (= 8.50 cryst. sulphate); cinchonia 7.35 (= 9.10 cryst. sulphate); total 25.24 (= 32.96 cryst. sulphates).

No. 4. *The Older Bark separated from its Liber.*—Quinia 15.05 (= 20.10 cryst. sulphate); quinidia 9.07 (= 12.05 cryst. sulphate); cinchonia 9.16 (= 11.46 cryst. sulphate); total 33.28 (= 43.61 cryst. sulphates).

No. 5. *The Liber.*—Quinia 11.20 (= 15.08 cryst. sulphate); quinidia 9.07 (= 12.00 cryst. sulphate); cinchonia 12.52 (= 15.70 cryst. sulphate); total 32.89 (= 42.78 cryst. sulphates).

It would appear from these analyses that the quinia is comparatively more abundant in the young bark, while the total yield of alkaloids from old bark, 32.24 per 1000, is a pretty satisfactory yield, when compared with first-rate commercial red bark, which, according to Frémy and Pelouze, yields 41.60 parts from 1000.

Unfortunately the plantations at Curepipe are subject to damage by periodical hurricanes; and it is, therefore, suggested that it may perhaps be practicable to establish a system of cultivation—as proposed by De Vrij—by which the young plants are cut down and uprooted when three or four years old, in order to have the bark from the root, which in an analysis made by De Vrij and Howard was found to contain the enormous quantity of 12 per cent. of alkaloids. Ph. J. Trans., July 10th, 1875, p. 21.

Cinchona.—Alkaloids in East India Bark.—B. H. Paul communicates the analysis of a number of commercial samples of East India bark which, in consideration of the abandonment of the manufacture of bark-alkaloids in India, he believes will very shortly become more abundant in commerce.

The following table has been compiled from the results as given by the author:

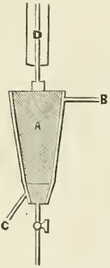
VARIETY OF BARK, Dried at 100° C. (=212° F.)	CRYSTALLIZED SULPHATES.		Cinchonia. Per cent.
	Quinia. Per cent.	Cinchonidia. Per cent.	
1. Cinchona succirubra, ...	1.59	2.70	0.95
2. " "	1.85	4 10	1.63
3. " "	1.62	4.97	2.05
4. " "	2.31	0.63	0 16
5. " "	2.37	0.38	0.12
6. " officinalis, var. "Amarilla del Rey."	6.08	0.98	Trace.
7. " officinalis, var. "Amarilla del Rey."	5.03	Trace.	0.13
8. East India Crown Bark—Renewed,	3.85	1.50	2.70
9. " " "	5.20	0.82	. . .
10. " " "	4 30	1.50	0.23
11. " " "	4.50	1 60	0.18
12. " " " Renewed,	3.80	1.20	0.22
13. Red Bark, Mossed, ...	1.72	. . .	1.70

The botanical characters of the first six varieties have been determined by Mr. Holmes. The average loss of weight in drying at 100° C. (= 212° F.) amounted to about 10 per cent. It is not known whether the last seven varieties are from the plantations on the mainland or from Ceylon. Ph. J. Trans., October 23d, 1875, p. 321.

Referring to Dr. Paul's paper, Dr. De Vrij remarks that as a matter of interest to the pharmacist, and the pharmaceutic application of cinchona barks, more importance should be placed upon the *total alkaloids* contained in the bark when publishing the results of analysis, since *all* of the bark alkaloids possess febrifuge properties. It is also of great interest to the pharmacist that the quantity of alkaloids which can be extracted by water *only* be determined. An infusion of bark, made by percolating the bark with cold water, possesses the advantage of containing a large percentage of the alkaloids (three-eighths of the total alkaloids of a red bark in an instance cited by the author); and, moreover, the chief part of the cinchotannic acid in its unaltered state. The author is continuing his investigations in this direction. Ph. J. Trans., November 13th, 1875, p. 381.

Cinchona.—Quick and accurate method of analysis.—E. L. Cleaver criticizes the methods commonly in use for the quantitative determination of the cinchona alkaloids, and recommends the following method as accurate and expeditious: Not less than 100 grams of finely-powdered bark are made into a paste with 25 grams of slaked lime, and dried over a water bath. The dry mixture is put into a percolator, which has the outlet closed by a tap, is provided with a steam jacket, and a movable cover having an upright condenser attached to it (see Fig. 25). The tap at the bottom being closed, a litre of strong methylated spirit* is introduced. Steam is then passed into the jacket, and the mixture well boiled for half an hour, the spirit that evaporates condensing and running back into the percolator. At the end of that time steam is turned off and the tap at the bottom opened, when the spirit will flow out. A little fresh spirit is poured upon the top of the mixture to displace that held in the mass, and the above operation is repeated. The percolates are then united, made faintly acid with sulphuric acid, and the spirit is distilled off. The remaining liquid† is then filtered, the filter is washed, and the filtrate and washings are evaporated to dryness with excess of pure carbonate of barium (which must be free from carbonate of sodium, otherwise the result will be vitiated). The residue is now exhausted with alcohol, and the liquid made up to a measured volume. With this the following determinations are made:

FIG. 25.



1. *The Mixed Alkaloids;* by evaporating a portion to dryness, and heating for some time at 130° C. (= 266° F.) in order to insure complete desiccation, which is not effected at 100° C. (= 212° F.).

2. *Separate Determination of the Alkaloids.*—A second portion is evaporated to dryness, the residue is exhausted with perfectly pure and dry ether, the solution is filtered, evaporated, dried at

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* Methylated spirit instead of alcohol applies, for obvious reasons, to Great Britain only.

† Evidently the author does not intend that all the spirit should be distilled off; or else the spirit contains more water than the designation strong methylated spirit would imply.

130° C. (= 266° F.), and weighed. This gives the total *quinia.*[*] A third portion is titrated with standard sulphuric acid, and by means of the following equations the proportions of the isomeric alkaloids are obtained:

Let X = the amount of quinia and quinidia in the weight of alkaloid taken.

The total weight taken — X = the amount of cinchonidia and cinchona present, then

$$\frac{X\ 98}{648} + (\text{the total alkaloids} - X)\ \frac{98}{616} = \left\{\begin{array}{l}\text{The amount of sul-}\\ \text{phuric acid used.}\end{array}\right.$$

The quinia found previously is then subtracted from the value of X, which gives the *quinidia.* That portion of the second portion which was insoluble in ether is then treated with warm dilute sulphuric acid, and made faintly alkaline with solution of soda. Rochelle salt is added, and the precipitate that forms after some time collected and weighed; it consists of tartrate of *cinchonidia* (containing 80.4 per cent. of cinchonidia), and when its weight is deducted from the weight of the mixture of cinchonidia and cinchonia found from the equation, the amount of *cinchonia* is determined.

Separation of Crystallizable and Amorphous Quinia.—The powder obtained by saturating the acid solution of the total alkaloids with carbonate of barium (and evaporating to dryness?) is exhausted with pure ether; this solution is evaporated to dryness, the residue dissolved in dilute sulphuric acid, heated to boiling, made faintly alkaline with solution of soda, and allowed to cool. The crystals of sulphate of quinia are collected, slightly washed, dried over a water-bath,[†] and weighed. The mother-liquors are either evaporated for a fresh crop of crystals, or 1 part of sulphate

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[*] The author evidently regards quinidia as insoluble in pure dry ether, and if such were true his following results would be correct. The results must, however, be decidedly inaccurate on account of the comparative ready solubility of that alkaloid in ether. Cinchonidia and cinchonia are also (the latter very sparingly) soluble in ether, and the author admits that the results are too high if *cinchonidia is present.* It is, moreover, somewhat doubtful whether by the term "cinchonidia" he designates the isomere of cinchonia, or that of quinia; the usual designation for the latter, "quinidia," being, as is well known, subject of controversy.

[†] The author finds that at a higher heat than that of the water-bath sulphate of quinia gains weight to 140° C. (= 284° F.); after that it fuses, and loses weight until constant.

of quinia is added to the weight found, for every 300 parts by volume of mother-liquor remaining. Ph. Jour. Trans., November 6th, 1875, p. 361.*

Cinchona.—Rapid Assay.—Herbelin recommends the following: 10 grams of coarsely-powdered bark are moistened with 30 grams of solution of ammonia; the two are well mixed and shaken repeatedly with portions of 30 grams of benzin (benzol?). The four or five benzin solutions are united, shaken with dilute sulphuric acid, and from the solution of quinia so obtained, the alkaloid is precipitated with ammonia, dried, and weighed. The operation may be completed within an hour, and the benzin serves for several operations. Ch. and Drug., July, 1875, p. 218.

Princewood Bark.—Under the name of "Princewood" two distinct plants, both of which are natives of the West Indies, are generally known; the wood being used for table and cabinet work, etc. One of these plants is the *Cordia gerascanthoides*, Kth., belonging to the natural order Boraginaceæ; the other is the *Hamelia ventricosa*, Sw., belonging to the Rubiaceæ, but the wood of these trees is so near alike that it is difficult to decide which of the trees furnishes the princewood of commerce. Recently samples of bark have been received at the Kew Museum from the Island of Andros, Bahama, under the name of Princewood Bark. This bark was described as the produce of a shrub or tree growing abundantly on the islands of Eleuthera and Andros, scantily on the island of New Providence, and probably on many of the southeastern islands of the colony. The bark is a popular remedy in the Bahamas for those complaints affecting the mucous membrane of the bowels, and is reported to have powerful tonic and astringent properties. Mr. John R. Jackson has identified the bark to be that of

Exostemma Caribæum, R. S.—This plant is described by Grisebach in his West Indian Flora as a fragrant shrub, ten to twenty feet high, widely distributed in Jamaica, Antigua, Dominica, Trinidad, Cuba, Mexico, and Guiana. It has been known as the Jesuits' bark of Jamaica, and in that island is sometimes called the Seaside beech. The bark is smooth, of a deep reddish-brown, but somewhat grayish on the outside; under an ordinary lens numerous small crystals are seen distributed over its surface. It

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* The author's paper occasioned considerable discussion at the pharmaceutical meeting of the Pharm. Soc. of Great Britain (November 3d, 1875), which will be found on pp. 372–375 of the Ph. J. Trans., November 6th, 1875.

breaks with a short, woody fracture, has a flavor at first sweet, but changing to astringent bitterness. This bark, together with other species of the same genus, seems to be well known in the West Indies for its bitter (febrifuge) qualities, and so highly is the bark of the Bahamas Princewood (E. caribæum) esteemed in the islands, that it has been suggested that the tree might prove valuable for acclimatization on the west coast of Africa. Samples of the bark have been submitted to medical men in New Providence for examination and report. Ph. J. Trans., February 26th, 1876, p. 681.

CAPRIFOLIACEÆ.

Sambucus Nigra.—Analysis of the Ash of the Bark.—G. C. Wittstein communicates the results of an analysis of the ash of the bark of Sambucus nigra, conducted by Joseph Huber. The air-dry bark lost upon drying at 110° C. (=230° F.), 11.666 per cent. of water, and yielded 10.350 per cent. of ash, which calculated for the dried bark = 11.717 per cent. This was composed of 13.956 per cent. of potassa; 0.965 per cent. of soda; 30.924 per cent. of lime; 10 730 per cent. of magnesia; 0.250 per cent. of alumina; 0.350 per cent. of oxide of iron; 0.179 per cent. of chlorine; 5.818 per cent. of sulphuric acid; 8.045 per cent. of phosphoric acid; 5.455 per cent. of silicic acid; 23.274 per cent. of carbonic acid. Arch. Pharm., Nov. 1875, p. 394.

UMBELLIFERÆ.

Æthusa Cynapium.—Chemical and physiological experiments made by Harley seem to prove this plant to be devoid of poisonous properties, and he has also failed to isolate an alkaloidal body. He and others had taken up to 90 grams of the freshly expressed juice of the small hemlock, up to 5 grams of the ripe seeds and 15 grams of the unripe seeds, without experiencing unpleasant results. These results are in contradiction to numerous cases of poisoning, which have been recorded as following the use of this plant, and must, therefore, be received with caution. Moreover, Ficinius and Walz had both isolated alkaloids; the first, a crystallizable, very poisonous substance; the latter, a liquid alkaloid, resembling conia and nicotina. Ph. Centr. Halle, No. 20, 1876, p. 170.

Abushaheree Hing.—The difference in the odor of the Hing of the Bombay market (the gum-resin of Ferula alliacea) as compared with that of ordinary assafœtida, has induced Professor Flückiger to subject a sample to distillation. The sample, presented by Professor Dymock, of Bombay, yielded an abundance of volatile oil, which, like that of the common assafœtida, contained sulphur, and is probably closely allied to it. The odor, however, is different, reminding more of garlic than of the common assafœtida, and it is the author's opinion that the two oils are not identical. During the distillation of the oil, a most repulsive odor is given off, and this would probably be altogether intolerable, if the distillation were carried on on a somewhat larger scale. The drug corresponds exactly to the third form of assafœtida described in "Pharmacographia," pp. 281 and 284 (see also Proceedings, 1875). Ph. J. Trans., Nov. 20th, 1875, p. 401.

Euryangium Sumbul.—A flowering specimen in the Kew Garden is described in "The Gardeners' Chronicle," July 3d, 1875, as follows: The specimen is nearly 8½ feet in height. The root-stock is somewhat fusiform in shape, about 3½ inches in diameter at the top, where it is thinly covered with the persistent fibres of the old leaves. Those of the present year commenced to wither soon after the flower-stem became visible, and were quite dead when its full height was obtained. They are supradecompound, much as in some species of *Ferula*, especially *F. campestris*, to the leaf segments of which those of the sumbul have a very close resemblance. The panicle is composed of about ten alternate spreading branches, the lowest about 5 feet from the apex. The umbels are on short stalks, with 10–13 umbellules. The stem on being wounded exudes a milky sap, which at first has the exact flavor of angelica, afterwards leaving a bitter taste. The resin of the root does not fully develop its musky smell until after contact with water. Ph. J. Trans., July 17th, 1875, p. 43.

Dorema Ammoniacum, Don.—Root and Gum-resin.—It does not appear to be generally known that the root of the plant which yields the *Ammoniacum* is an article of commerce in Bombay. According to Prof. W. Dymock, it is imported in large quantities from Persia, under the name of *Boi*, and is used in the Parsee fire temples as an incense. The roots vary in size, the largest being three inches in diameter at the crown; they are generally more or less forked; the root-bark is thin and papery like that of Sumbul, but the root itself is compact, and has a resinous section. A small specimen, powdered and exhausted with boiling water, yielded about 1 oz. of dark-colored ammoniacum. It is this root which some years ago was exported to Europe as "Bombay Sumbul," after having been cut up and impregnated with musk. When old and wormeaten, it becomes of a loose and spongy texture, and might be taken for sumbul by a superficial observer.

Bombay appears to be the chief mart for ammoniacum, and it is here that the original packages—bales, generally of matting or coarse canvas, which contain all parts of the plant broken up and incrusted with the adherent exudation—are opened and sorted for the various markets. The collection evidently takes place after the plant has matured its fruit, and scarcely any attempt seems to be made by the collectors to separate the plant from the gum-resin, which appears to exude from every part; and even the seed, which is separated in large quantities in the sorting-room (it is given to cattle), is coated with the resinous exudation. Ph. J. Trans., Oct. 23d, 1875, p. 321.

ARALIACEÆ.

Ginseng.—Mr. J. R. Jackson contributes to the "Gardeners' Chronicle" an interesting paper upon ginseng. The Chinese article he believes to be the root of *Panax Schinseng*, Nees, and it is this which is preferred by the Chinese, while the root of *P. quinquefolium*, which was at one time largely exported to China from the United States,* is now generally rejected. The author gives an interesting description of the medicine and the uses to which it is applied, as found in the great Chinese botanical work known as "Pure Tsao," and also some other facts in regard to the great repute the medicine enjoys, the care taken in its preservation, and the method of preparing it for administration. By the laws of the present dynasty all ginseng dug up surreptitiously is confiscated, and, moreover, a fine is imposed upon the culprit. Those wishing to seek for the root must be provided by the official in charge of the locality (the imperial ginseng inclosure in Manchuria is said to contain some hundreds of square miles) with a permit authorizing them to pass the barrier. On returning, the ginseng collected must be produced before the official, that he may determine by inspection the amount, and state the percentage which is the emperor's due. The imperial share is sent to the Home Office at Peking, and is there separated according to its different qualities. The best is prepared for imperial use; the in-

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* In our southern and western cities ginseng is readily disposed of to dealers, and rules at fast prices, showing that there is still a foreign demand for it, and doubtless for export to China.

ferior kinds are given as presents to the court officials. Presents of this root are frequently made, and accompanying this medicine is usually sent a small, beautiful, double kettle, in which the ginseng is prepared, as follows: The inner kettle is made of silver, and between this and the outer vessel, which is a copper jacket, is a small space for holding water. The silver kettle, which fits on a ring near the top of the outer covering, has a cuplike cover, in which rice is placed with a little water; the ginseng, with water, in the inner vessel, a cover placed over all, and the apparatus put on the fire. When the rice in the cover is sufficiently cooked, the medicine is ready and is then eaten by the patient, who drinks the ginseng tea at the same time. The ginseng is preserved in close receptacles, wrapped in innumerable wrappers, and surrounded by packages containing quicklime, with a view to excluding it from the air and keeping it dry. Each root is covered, according to its value, with silk, either embroidered or plain, cotton, cloth, or paper. The price ranges from six to twelve dollars for the more ordinary, to three hundred and four hundred dollars an ounce for other portions. Ph. J. Trans., July 31st, 1875, p. 86.

RANUNCULACEÆ.

Hydrastis Canadensis.—Examination of the Third Alkaloid.—John C. Burt has made a series of experiments which confirm the observation of A. K. Hale, that Hydrastis Canadensis contains, besides berberina and hydrastia, a third alkaloid (see Proceedings, 1873, p. 232). In addition to the observations of Hale, the author communicates the following: The presence of nitrogen was shown by distilling a portion of the alkaloid with caustic potassa and permanganate of potassium, and determining the presence of ammonia in the distillate. The hydrochlorate solution of the substance in question gave a reddish-yellow precipitate with bichloride of platinum, soluble in warm hydrochloric acid; a yellowish-white flocculent precipitate with protochloride of tin, a flesh-colored precipitate with acetate of lead, a bright-yellow precipitate with iodide of cadmium, a reddish-yellow flocculent precipitate with iodide of cadmium and potassium; the corresponding mercury salt precipitates it straw-colored; bichromate of potassium, brown-yellow; perchloride of iron colors the solution dark-brown or black; ferrocyanide of potassium produces a greenish-blue solution, and tannic acid a light-yellow precipitate. The accompanying illustrations (Figs. 26, 27, 28) very plainly show the difference exhibited by the three alkaloids of hydrastis under the microscope, the berberina being as hydrochlorate, the hydrastia in an alkaloidal condition, and the third alkaloid as sulphate, the latter forming prismatic needles, imperfectly arranged in sheaf-form clusters. Am. J. Ph., November, 1875, p. 481.

FIG. 26.

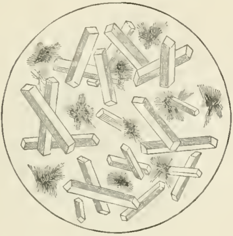
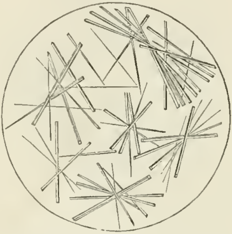


FIG. 27.

Aconites.—Innocuous Properties of some.—Prof. C. D. v. Schroff has contributed an interesting paper to "Zeitschr. d. Œst. Apoth. Ver.," in which he assumes views that are contradictory to the statement on page 8 of Flückiger and Hanbury's "Pharmacographia," that the poisonous qualities of *Aconitum napellus* are not developed in certain localities. According to his views, the poisonous properties of aconite (and other plants) are not materially affected when growing wild in different localities, provided the position be a natural one. In Lapland the leaves of *Aconitum septentrionale*, Kœlle, which may be regarded as a variety, with blue flowers, of *A. lycoctonum*, Lin., are used as a pot herb. V. Schroff, Jr., obtained (1871) from the root of the Norwegian *A. septentrionale* a very poisonous bitter alkaloid, while the herb contains the same principle in such minute quantity that it cannot be regarded as poisonous, except in very large quantities. *A. lycoctonum* shows the same relation of the root and herb. Hooker states, in his "Flora of British India," that the roots of *A. multifidum* and *A. rotundifolium* are eatable; and Royle describes the former plant as being allied to *A. anthora*, the root of which was formerly medicinally used as a tonic. Aconite, it appears from these accounts, does not become innocuous when growing in particular localities; but the root and herb of some species of aconitum are destitute of poisonous properties. Ph. J. Trans., September 18th, 1875, p. 222; from Z. Œst. Ap. Ver., 19 and 20, 1875.

FIG. 28.



Coptis Teeta, Wall.—This East Indian drug is remarkable for containing 8½ per cent. of berberina. It appears to be identical with the Chinese drug Mu-lien, referred by Dr. Porter Smith to a species of *Justicia*. Like calumba, it is used as a pure tonic bitter (J. M. at K.). Ph. Jour. Trans., August 7th, 1875, p. 101.

MENISPERMACEÆ.

Chondodendron Tomentosum, R. et P.—In the "Pharmaceutical Journal" (London), May 16th, 1874, p. 910, Mr. John Moss drew attention to the fact that the so-called Pareira root, as imported, was really a mixture of root and stem in about equal proportion. Several packages examined since then, have shown an average of not less than 75 per cent. of stem. This extensive substitution of one part of a plant for another of recognized efficacy, makes it highly desirable that their relative value as remedies should be ascertained, and it is in anticipation of this being done very shortly that Mr. Moss has commenced an examination of the less-known stem, as regards its anatomical structure and the principles obtainable from it by the processes known to pharmacists. The author's present paper deals only with the first part of the examination,—that which attempts to elucidate the structure of the stem. Unfortunately this portion admits of very little condensation, and as it is too lengthy to find place in this report in its entirety, the reader is referred to the original paper, in "Ph. Jour. Trans.," March 4th, 1873, pp. 702 to 707. The paper is illustrated by the cuts of a transverse and a longitudinal section of the pareira stem.

RUTACEÆ.

Dictamnus Creticus.—This plant is indigenous to the island of Crete, where the flowers and leaves are collected, tied up in small bundles, and sold as an excellent remedy against dysmenorrhœa and amenorrhœa of young women. In ancient times it enjoyed a very great reputation in many ailments of women, and it is to be regretted that it, like many of the useful plants, has been neglected in modern times in favor of others not possessing the same virtues. Prof. X. Landerer, in A. J. Ph., May, 1876, p. 194.

Buchu.—Distilling off the remaining alcohol from a partially exhausted lot of buchu., Prof. E. S. Wayne obtained a quantity of volatile oil of buchu, which, when treated with caustic soda solution, was diminished to nearly one-half, the soda solution forming a clear liquid with the remaining portion. The alkaline solution, upon neutralization with hydrochloric acid, separated an abundance of crystals, which, upon recrystallization from boiling water, were colorless, proved to be salicylic acid, giving all the reaction for that acid. Subsequently the author, operating on buchu leaves direct, and upon the residues of buchu remaining from fluid extract, obtained small quantities of volatile oil, from which solution of soda separated comparatively small portions. The alkaline solutions so obtained also deposited a crystalline substance upon neutralization with hydrochloric acid, but the substance so obtained failed to give the deep purplish-red color with ferric chloride, which is so characteristic of salicylic acid, but gave a deep blue-black color instead. The author is of the opinion that this substance is capable of yielding salicylic acid, and promises to continue his researches. A. J. Ph., Jan. 1876, p. 19.

Jaborandi.—As has become evident by the papers extracted for the previous "Report" (Proceedings, 1874), the term *Jaborandi* is not confined to a single plant, and this is fully confirmed by Theod. Peckolt, who describes a number of Brazilian drugs, popularly known by that name, among which that which he believes to be the true Jaborandi. This variety is the

Serronia Jaborandi, Guill. (Syn. *Ottonia Anisum*, *Spr.*, and Ottonia Jaborandi, Kth.), belonging to the *Piperaceæ*, and popularly known in the province of Rio de Janeiro as *Jaborandi*, while in some other districts it is called *Jaborandi do mato.* It is an elegant shrub, about six feet high, which selects for its habitat the best soil in shady places of the primitive forests. It is sparingly branched, bears opposite, oval, lanceolate, leathery leaves, with short pedicles, and of a deep green color on the upper, and pale-green color on the under surface. The root-stalk, which ends almost on the surface of the ground, is provided with numerous long, thin, root-fibres, which are quite tough, of a brown color externally, and yellowish-white internally. Among the people the root is almost exclusively used, but the author has employed the fresh leaves, in form of an aqueous fluid extract, for the past 20 years with decided success, as a sudorific in chronic rheumatic and catarrhal affections. He also finds the tincture of the leaves to be an efficient preparation, and that it possesses more activity than an infusion of the dry leaves. The tincture of the root he finds to be not only a powerful sudorific and diuretic, but he finds it also to possess powerful stimulant properties. The tincture of the leaves is prepared by macerating the finely pounded fresh leaves in an equal part of absolute alcohol; that of the fresh root in 4 parts of alcohol; 30 to 60 grams of these tinctures are given every quarter of an hour until sweating is produced.

Dr. Peckolt, in 1861, subjected a portion of *fresh roots* to analysis, but was at the time prevented from completing it, and has since not found time to do so. He obtained by distillation with water a yellowish, *volatile oil*, which was heavier than water; had a strong, peculiar, somewhat peppery odor, and a sharp, burning taste, leaving a benumbing sensation upon the tongue. Its sp. gr. at + 14° C. (= 57.2° F.) was 1.0356, and it had the following reactions:

Sodium is immediately oxidized, and the oil becomes browned.

Iodine is readily dissolved without noteworthy reaction.

It only dissolves traces from red saunders, and acquires an orange-yellow color.

Solution of chromate of potassium and *sulphuric acid* color the oil deep brown, and it acquires a pelargonium like odor; when heated violent reaction takes place.

Fuming nitric acid produces violent reaction, and forms with the oil a red-brown solution, from which, on the addition of water, an orange-red oil separates.

Nitric acid colors the oil immediately intensely yellow, without noteworthy reaction. After 24 hours the color of the oil is changed to a handsome red yellow, and that of the acid to a deep yellow, while the odor is like that of acrolein. Upon applying heat, violent reaction results, nitrous vapors are copiously evolved, the oil becomes heavier than the acid, and subsides in the form of a dark-brown syrupy liquid.

Conc. sulphuric acid produces a violet-brown coloration, which in a short time assumes a violet red tint. If water is then added, a portion of the oil sinks to the bottom in the form of a black-brown mass.

Hydrochloric acid produces very little reaction; the oil is browned slightly after a time, and becomes somewhat darker upon heating.

By boiling the fresh root in absolute alcohol and allowing the tincture to cool, a brown amorphous substance deposits, which seems to be a resinous acid, and which the author exhibited in 1861 (in Rio Janeiro and subsequently in London) under the name of *Jaborandinum.* Finally, Dr. Peckolt's remarks upon the term "Jaborandi" as applied in various localities are of interest.

1. *Jaborandi* (of Piso) of the provinces of Pará, Maranhao, and Amazonas, is the leaves or root of

Monnieria trifolia, Linn. (Syn. Aubletia trifolia, Rich.), belonging to the Rutaceæ. This is a branched, annual plant, having pale-green, tri-lobed leaves, which possess an aromatic odor, and possess, as does also the root, diuretic and diaphoretic properties.

2. *Jaborandi* (of Riedel) of the same provinces, is the leaves and bark of

Xanthoxylum elegans, Englm., used for the same purpose as the above.

3. *Jaborandi bravo* (of Arruda) of the provinces of Alagôas, Parahyba do Norte, and Minas Geraes, is

Piper Jaborandi, Willd. (Syn. Piper electricum). A shrub from 0.5 to a metre high, with oval, opposite, dark-green, leathery leaves. The leaves are seldom used, but the root is popularly used as a most active diaphoretic and aphrodisiac. In these provinces the root and stems of

4. *Jaborandi Enkia glaucescens*, Miq. (Syn. Piper nodulosum, Lk.) are also used as a sudorific and diuretic.

5. *Jaborandi Enkia reticulata*, Miq. (Syn. Piper reticulatum, Linn.) is used as a sudorific in the provinces of Minas Geraes, S. Paulo Matto Grosso, etc. This is a small shrub, the rough, pale-green leaves of which are the parts used. Finally,

6. *Artanthe Mollicoma*, Miq., is known in Rio de Janeiro, along with the true Jaborandi, as Jaborandi (in some districts as *Jaborandi mano*), and its leaves are used for the same purposes as those of the true drug. Ph. Centralhall., No. 37, 1875, pp. 305–309; from Ph. Post.

E. Schaer reviews the history of jaborandi since its introduction several years ago, and communicates some additional observations on "Pernambuco jaborandi." His pharmacognostic examination of the drug make it evident that the smooth-leaved Pernambuco jaborandi is derived from Pilocarpus pennatifolius, while, it is probable, the hairy variety is derived from a very closely allied species of Pilocarpus, or a variety of the same plant. This opinion is based upon a comparison of the drug with a living specimen of P. pennatifolius, which the author had received from Prof. Flückiger. Experiments made with the leaves and the bark of the small stems accompanying this variety of jaborandi are summed up by the author as follows:

1. The residue obtained by carefully evaporating the alcoholic

tincture of the leaves or bark upon a water-bath, yields to chloroform and several similar solvents a brownish resin (which probably corresponds with Gerrard's "acid resin" obtained from the same drug).

2. The same residue, when heated with water acidulated with sulphuric acid, yields a filtrate which

a. Possesses the property of reducing alkaline solution of copper in a remarkable degree;

b. After careful neutralization with caustic soda evidences very plain alkaloidal reaction on the addition of solution of tannin, picric acid, phosphomolybdic acid, bichloride of platinum, corrosive sublimate, iodine, or iodo-hydrargyrate of potassium.

3. The above-mentioned resin, when dissolved in chloroform and heated with acidulated water until the chloroform is completely dissipated, yields a filtrate in which glucose cannot be detected; the resin in question is, therefore, not a glucoside.

4. With a view to proving the presence of alkaloid in the bark as well as the leaves, the following additional experiments were made:

a. An aqueous decoction of the substance made with neutral water, and which was turbid from suspended volatile oil and resin, was clarified by agitation with a little ether, filtered, and tested with the above-named reagents, with most of which it gave alkaloidal reactions. With Fehling's solution no reaction for glucose was obtained, and it therefore seems probable that the glucose observed in the solution of the extract in acidulated water abovementioned (2 *a*) is due to the decomposition of a glucoside not yet determined.

b. An infusion prepared with acidulated water, which gave strong evidence of the presence of glucose, was divided into two portions.

One of these was evaporated to dryness with magnesia, extracted with alcohol, the alcoholic filtrate evaporated, and the residue dissolved in acidulated water. The solution so obtained gave all the important reactions of an alkaloid. The other portion was tested for and gave evidence of alkaloid by the method of Stas, as well as by the modification of that method by Dragendorff.

It seems, therefore, beyond doubt that both the bark and leaves of the Pilocarpus jaborandi contain either an alkaloid or a principle very closely allied to these; but it remains to be determined whether this substance is the active ingredient of jaborandi.

5. By the distillation of small quantities of the leaves with 20

parts of water, and repeated cohobation of the first portion of distillate, a faintly turbid distillate was obtained, which possessed plainly the odor of the drug and an aromatic taste, but from which a volatile oil could not be separated, doubtless owing to the small percentage contained in the drug. Schweiz. Wochenschr. f. Pharm., Nos. 18, 19, and 20, 1876, pp. 143, 151, and 159.

In a recent communication to the Société de Thérapeutique, Ernest Hardy attributed to jaborandi (*Pilocarpus pennatifolius*) a very complex composition. He states that by exhausting the leaves and stalks with water and alcohol successively, he has obtained first an alkaloid which he terms "Pilocarpina," then a volatile body forming voluminous crystals, and appearing to possess acid properties, and finally a second alkaloid. These two latter bodies have not been sufficiently investigated to allow of their being named, nor does it clearly appear upon what ground the author considers the last mentioned to be an alkaloid differing from "pilocarpina." Ph. J. Trans., July 10th, 1875, p. 24.

A. W. Gerrard has continued his experiments upon jaborandi, both leaves and bark (of *Pilocarpus pennatifolius*), and confirms his previously obtained results. It possesses a complex organization, containing an alkaloid possessed of well-marked chemical and physiological properties, which is itself non-crystalline, but is capable of forming with acids crystalline salts. Jaborandi also probably contains a second alkaloid, forming acid salts. Besides these, there are present an aromatic essential oil, solid at ordinary temperature, tannic acid, a peculiar volatile acid, and chloride of potassium. This latter, as obtained in certain stages of the process, has probably been mistaken by E. Hardy for a second alkaloid. The bark contains a smaller proportion of alkaloid, and this as well as the *pilocarpina* from the leaves, was subjected to the action of various reagents, for which the reader is referred to the original communication in the "Year-book of Pharmacy," 1875, or to the "Ph. Jour. Trans.," September 18th, 1875, p. 227–8.

William Murrel has made physiological experiments with Gerrard's pilocarpina, which prove it to be an energetic agent, and specifically antagonistic to atropia. Ibid., p. 228.

Physiological experiments made by Dr. Merkel lead him to results which correspond closely with those previously obtained by Dr. Riegel. They prove jaborandi to be an energetic diaphoretic and sialagogue, and that in doses of 3 to 5 grams it possesses no unpleasant action, except slight nausea and occasionally emesis. The latter effect may, however, be caused by swallowing the saliva, which is produced often in excessive quantities. The action of jaborandi, moreover, is different upon different individuals, some being not thrown into sweat at all, although readily perspiring by means of other agents. The new drug cannot, therefore, be regarded a specific. It was administered in form of infusion, five minutes infusion producing an effective preparation. N. Rep. Ph., No. 5, 1875, p. 306.

SIMARUBEÆ.

Indian Simarubeæ.—A. W. Bennett communicates some additions and corrections to his previous notes on the Simarubeæ of India (Ph. Jour. Trans., 1873, pp. 801, 841, and 881). The plants considered in this paper are: *Ailanthus excelsa*, *A. malabarica*, *Samadera indica*, *Picrasma quassinides*, *P. nepalensis*, Benn., *Harrisonia Bennetii*, Hook. The author states that the genus *Irvingia*, Hook. f., containing from three to four species, should be added to the Simarubeæ, and should immediately follow the genus *Suriana*. The botanical characters of *Irvingia malayana*, Olio., are described. Ph. Jour Trans., August 28th, 1875, p. 162.

Xanthoxylum Peckoltianum, *Engl.* — Theodore Peckolt some years ago made a partial examination of the leaves of this Brazilian plant, and now communicates his results to Zeitschr. Œst. Ap. Ver. (No. 26, 1875, p. 418). The plant abounds in Cantagallo, province of Rio de Janeiro, and is there known under the name of *Arrudo do matto;* a term which in some other provinces is applied to other plants. Thus in the province of Maranhao the same name is applied to *Pilocarpus officinalis*, Abl.; in the province of Pernambuco, to *Indigofera similerula;* and in the province of S. Paulo, to *Hypericum teretius*.

The *Arrudo do matto* of the province of Rio de Janeiro is a many-branched shrub, bearing small pinnate leaves, which resemble senna leaves, and possess a strong unpleasant odor, resembling that of rue. It blossoms in June, and its fruit ripens in November. The latter is of a violet color, about the size of a small rifle-bullet, possesses a nauseous taste, and an odor of bed-bugs. The fresh leaves are popularly used for producing abortion, the expressed juice being administered in doses of ½ to 1 cupful. While the author has not arrived at any satisfactory conclusion in regard to its value as an abortive agent, he has found it to possess very active emmenagogue properties, and believes that it deserves more attention as a therapeutic agent than has hitherto been given to it.

From 10 kilograms of the fresh leaves gathered in June, the author obtained by distillation 7.185 grams of volatile oil; and from a like quantity gathered in October, he obtained 6.875 grams. This oil is of a green color, has a sp. gr. of 0.894 at 15° R. (= 65.75° F.), an unpleasant rue-like odor, and a persistent, sharp, and nauseous taste. It is neutral, and producing no reaction upon metallic sodium, is evidently a hydrocarbon. It dissolves sandal-red with difficulty, producing a cherry-red solution. Iodine produces no marked reaction; solution of bichromate of potassium containing sulphuric acid when shaken with it, forms three layers, which unite after twelve hours' standing, forming a dark-brown liquid, which possessed little odor; when this mixture was gently heated it lost its odor and became darker, and when heated to boiling excessively violent reaction set in. Nitric acid produces no reaction at first, but in the course of an hour the oil becomes turbid, in twelve hours it assumes a brownish-violet color; when boiled violent reaction occurs, accompanied by copious evolution of an exceedingly irritating gas, and upon cooling a resinous mass remains. Fuming nitric acid reacts with explosive violence; when the reaction is made very carefully in a freezing mixture, the oil is oxidized to a pulverulent yellow resin. *Sulphuric acid* immediately colors the oil red-brown, which soon changes to purple, and after twelve hours the oil is converted into a thick liquid resinous mass. *Hydrochloric acid* produces no reaction at first, but after twelve hours the oil becomes light brown and the acid rose-red. Upon separating the oil it becomes black-brown, and gives off an unpleasant rancid odor. The author proposes to continue his experiments, and to report at a future day.

MALVACEÆ.

Cotton-root Bark. — A sample of cotton-root bark which corresponded perfectly to the botanical description recently given by Prof. Maisch (see Proceedings, 1875), has been the subject of examination by W. C. Staehle. After describing the microscopic character of the bark, the author details the results of his chemical investigation. By treating the alcoholic extract of the bark he obtained a resin, which when thoroughly washed, dried, pulverized, again washed and dried, had the appearance of powdered cochineal, and amounted to 7.93 per cent. of the powdered bark. It was found to be soluble in 14 parts of alcohol, 15 parts of chloroform, 23 parts of ether, and in 122 parts of benzol, and was also dissolved by solutions of the caustic alkalies, from which it was again precipitated by an acid. A drop of a solution of the resin gives with solution of hydrate of potassium a bright red color, which, on addition of water, pales to a sage-green. The resin is soluble in sulphuric acid with a reddish-brown color. The residue of bark, after treatment with alcohol, yielded to ether a matter resembling caoutchouc. No alkaloid was found in the bark.

The author's results differ in some important particulars from those obtained by Wayne (see Proceedings, 1875). The latter had obtained a pale amber-colored percolate with alcohol, whereas that obtained by the author was dark reddish-brown. The resin, whether obtained from liquids evaporated spontaneously or by heat, in the light or in the dark, was uniformly of the same color, whereas Wayne had attributed the final color of the resin to the influence of heat. Wayne had also found the resin, after the action of the heat in the retort, to be insoluble in alcohol, chloroform, ether, and aqueous ammonia; the author found it soluble in each of these solvents. A. J. Ph., October, 1875, p. 457.

STERCULIACEÆ.

Adansonia Digitata.—The fruit of this plant, known as baobab, has some repute in India as a remedy for dysentery, the pulp or rind being used. The juice is used in Africa as a specific in putrid and pestilential fevers. The bark has been employed as a substitute for quinia. (J. M. at K.) Ph. J. Trans., August 7th, 1875, p. 102.

TERNSTROMIACEÆ.

Tea.—Cultivation in Japan.—According to a report of Mr. Robertson, British consul at Komagawa, tea is said to have been first introduced in Japan from China in the year 782, but it did not come into universal use until 1190. The districts of Uji, Daigo, and Togano, situated in Yamashiro, have a reputation for the best tea, and next to these Surumi, in Omi, takes rank, but the shrub is very generally grown throughout the empire. The ground best adapted to its cultivation exhibits a reddish soil, mixed with small stones, open to the south and east, but shut in from the north and west, and situated in warm but yet temperate climates. The plant blossoms in autumn, and the seed or nut follows the flower, but does not ripen until the winter of the ensuing year. When ripe the nut bursts and the seed falls to the ground. This is known as "ochiko," is stored in bags, and is reckoned the best for sowing.

If the plantation is a good one the seedlings will yield a crop after the third year. The time for picking depends upon the temperature of the season, but the most fitting time is when the shrub is in what is known as the three-leaf stage, and when summer has well set in. This picking makes the best tea. When four or more leaves appear they are somewhat dry in consistency, and make inferior tea. Thirty days after the first picking comes the second picking for medium teas. The method of curing the leaves, preparing them for the market, and preserving the tea, and the method of cultivation and manipulation necessary for the production of the so-called "powder tea" is also described. The latter brand of tea is of two kinds, "koicha" and "usucha," and is esteemed a great luxury among the Japanese. Ph. Jour. Trans., August 14th, 1875, p. 128.

Tea.—Analysis and Determination of Moisture and of Hygroscopic Properties.—Mr. G. W. Wigner finds that the moisture in teas bears a certain relation to the individual kind of tea, and that its limits of variation are wider than is generally supposed. Tea is hygroscopic, and when exposed to the air after having been dried at a temperature of 212° F. will gain weight with considerable rapidity. Thus, high-dried teas, such as hysons and gunpowders, contain the smallest amount of moisture, while those that have been dried at a lower temperature, such as congons, give a higher average; the hysons 4.84 to 5.68 per cent.; the gunpowders 4.94 to 6.55 per cent.; the congons on the average, 8.50 per cent. The average loss of water in thirty-five samples of tea, comprising Hyson, Gunpowder, Oolong, Mannuna, Indian, Kaesow, Pekoe, Souchong, Caper, Congon, and Moning, was 7.67 per cent.; while the average weight of water reabsorbed after eleven days' exposure to the air was 6.93 per cent. in the same samples, showing a regain of all but 0.74 per cent. of moisture. The different classes of tea showed, however, strikingly different results. Nearly every sample of congon tea failed to reach the original weight by 1.7 per cent., and in the case of pekoes the ultimate loss amounted to about the same; while, on the other hand, the high-dried teas—hysons and gunpowders—show an increase in every case, averaging more than 1 per cent. The author's paper is accompanied by a tabular statement of the moisture lost and gained, and by tables giving the percentage of ash, and a partial analysis of the same from forty pure samples of ordinary teas and twenty-seven of special varieties, from which we obtained the following

Average of Sixty-seven Samples.

	Total ash. Per cent.	Ash soluble in water. Per cent.	Ash soluble in acid. Per cent.	Silver.	Potash.
Average,	5.78	3.15	2.17	0.46	1.45
Maximum,	7.02	3.88	2.87	1.67	1.96
Minimum,	5.17	2.64	1.33	.04	1.08

These analyses have all been made on a uniform plan, viz.: Igniting 100 grains of tea, boiling the ash in 5 ounces of water, and washing on the filter with cold water. The alkali is estimated by adding normal acid and titrating back.

The method employed for determining the extractive matter of tea is by no means a matter of indifference. The proportion of soluble matters yielded by tea differs very greatly according to whether the tea is powdered or in whole leaf, and also according to the amount of water used and the number of extractions to which the sample has been submitted, as illustrated in the following examples, in each of which the tea was boiled for an hour under a vertical condenser, cooled, filtered, and the extract evaporated:

1	part of	tea in	200	parts of	water	yielded	34.10	per cent.	of extract.
1	"	"	100	"	"	"	30.55	"	"
1	"	"	50	"	"	"	27.55	"	"
1	"	"	20	"	"	"	22.96	"	"

The exhausted leaves from the last-named yielded when boiled a second time with the same quantity of water, 8.17 per cent.; the third time, 3.75 per cent.; the fourth time, 1.79 per cent.; making a total of 36.67 per cent. of extract, when boiling 1 part four times successively with 20 parts of water; and these general figures have been confirmed by operating upon different samples of tea. The author finally adopted 1 part of tea to 100 parts of water as giving the most reliable and uniform results, and, operating on this plan, determined the amount of extract, and the ash of extract from twenty-four genuine teas. The average of all these results is, Extract, 35.79 per cent.; ash of extract, 4.63 per cent.; while the maximum and minimum extract are 44.85 per cent. and 26.15 per cent. respectively, and of the ash 7.0 per cent. and 4.05 per cent. respectively. The author believes that the determinations of extract are of little value in ordinary cases, but may become so in cases of partially exhausted tea. The adulteration of tea with exhausted leaves, foreign leaves, and siliceous matter the author believes is not now practiced. Inferior teas, now found in the English market, are either the remains of old stock, or some chests which have been recovered from wrecked vessels and redried. To the latter class the determination of the extract is of importance, and they are distinguished also by the large amount of common salt contained in the ash. Ph. Journ. Trans., 1875, October 2d, p. 261; October 9th, p. 281; November 20th, p. 402.

AURANTIACEÆ.

Lemons.—Prof. X. Landerer states that millions of lemons were formerly wasted on many of the Grecian islands, on many of which they are very abundant. Latterly, however, they are utilized, the juice being expressed, concentrated, and exported to England; while from the peels the oil is obtained either by expression or distillation. The cultivated lemons are, on some of the islands, very prolific, a single tree on the island of Poros having been known to bear over 20,000 fruits during a season. N. Rep. Ph., No. 2, 1876, p. 119.

VITACEÆ.

Vitis Vinifera.—X. Landerer states that, in Greece, unfermented grape-juice is evaporated to the consistence of a syrup, ashes of the grape-vine being added for the purpose of neutralizing the acidity, and thus imparting to the preparation a sweeter taste. It is called *Betmése*, is eaten with bread by the rich and poor, and is extensively used for preparing other confections and preserves. The fruits of *Solanum Melongena*, and of the Cedro, are thus preserved, and in the island of Eubœa, and in many other parts of Greece, almonds and nuts are strung upon threads and repeatedly dipped into betmése, until the kernels are sufficiently covered, when they are dried, and are then called *sousukea.* Starch is likewise mixed with this grape-juice, and after boiling and refrigeration, forms a jelly called *moustopyta*, which is cut into pieces and highly esteemed. Benne seeds, almonds, and other aromatics, are sometimes added to this jelly, which is then dried in ovens, and kept for use during the winter. A. J. Ph., Dec. 1875, p. 534.

Sherry Wine.—J. B. Francis communicates an interesting paper on Sherry Wines. True sherry, which derives its name from the capital of the province of Andalusia, Xeres de la Frontera, is the product of the district of Cadiz, whence it is exclusively exported. The vineyards are situated on slopes and declivities between the rivers Guadalquivir and Guadalete, those producing the best wines which contain a soil composed of the carbonate of lime and magnesia, mixed with clay. The grapes are allowed to hang in the sun till they begin to shrivel, when they are gathered and carefully sorted for the better wines. The fruit, dusted over with plaster of Paris, is placed on large wooden platforms, where it is trodden on by men; the juice which runs from the grapes is by some producers kept separate, but by others it is mixed with that obtained by the use of the press after the treating. The juice is filled into butts, and these are transferred to the *bodega*, or storehouse. Here, during December, January, and February, the must ferments. After the first fermentation the liquor is raked from the lees, and each butt of new liquor receives about six to eight gallons of spirits, varying according to the wine. The common sorts are clarified and mixed with further quantities of spirit, so as to be in a condition for export in eighteen months after vintage; but the better sorts are not exported until after two or three years, a small quantity of very fine old wine or *solera* being added to increase the flavor. The addition of spirit to the ordinary sherries is necessary on account of the large amount of albuminous matter they contain. The best natural wines contain not more than 12 per cent. of absolute alcohol; inferior varieties from 8 to 9 per cent.; and when they contain 17 to 23 per cent., this is due to the addition of brandy. About 25,000 acres are under cultivation, producing about 50,000 butts, of 106 imperial gallons each, annually. Good wines are very scarce, and command $300 per butt on the spot where it is produced. The more ordinary wines are much cheaper, and the common wine of the country may be bought for 12 cents per bottle. The Laboratory, Aug. 1875, p. 3.

California Wine.—Analysis.—J. M. Merrick has subjected a number of California wines to analysis, and finds them on the average to be 32.8 per cent. stronger than the corresponding German wines. The method of determining the alcohol was that of Tabarie, which is recommended as trustworthy by Balling, Mulder, Thudichum, and Dupré. The process is a very handy one, and consists in taking the sp. gr. of the wine, evaporating to one-fourth the original bulk, making up to the original volume with distilled water, and again taking the specific gravity. The results so obtained furnish the data for the calculation of the percentage of alcohol contained in the wine. The author thinks that the excess in strength of the California over the German wines need not necessarily be due to artificial strengthening, *i. e.*, by the addition of brandy.

In the following tables the author's results with California wine, and for comparison, the results of Thudichum and Dupré with corresponding grades of German wines, are given:

CALIFORNIA WINES.

NAME.	Sp. gr.	Per cent. Alcohol by volume.	Residue at 100° (= 212° F.)	Ash.	Alkalinity.	Insoluble residue.
No. 1. California Riesling, 1865,	0.989	12.	2 05	0.26	0.01	0.053
" 2. " Gutedel, 1868,	0.9906	11.	1.99	0.21	0.024	0.04
" 3. " Muscatel, 1870,	0.9901	13.	2.45	0 24	0.03	0.008
" 4. " Angelica, . .	1.0591	11.50	13.20	0.272	0.045	0.044
" 5. " " . .	0.9835	21.	2.40	0.10	. . .	. . . .
" 6. " Hock, . . .	0.9891	14.	1.80	0.20	0.31	0.04

GERMAN WINES.

NAME.	Sp. gr.	Per cent. Alcohol by volume.	Residue at 100° (= 212° F.)	Ash.	Average Alcohol per cent. of 35 wines examined.
Leisten Riesling, ...	0.9923	11.21	1.13	0.22	9.26 per cent.
Stein "	0.9917	11.15	0.96	0.21	
Selzener, ...	0.9815	11.77	2.075	0.204	
Patras, ...	0.9820	11.39	13.10	0.306	

Am. Chem., Sept. 1875, p. 85.

DIPTERACEÆ.

Gurjun Balsam.—Dr. Hager reviews the history, nature, and properties of this drug, which, within the last few years, has been revived in England as a remedial agent. It is obtained in a manner similar to balsam of Peru from various gigantic East Indian trees, belonging to the Dipterocarpus family, a single tree yielding occasionally 180 litres of the balsam. It has (in its recent condition?) the consistence of olive oil; is dichromatic, appearing brown or reddish-brown by transmitted light, and greenish-brown or olive-green by reflected light. Its odor reminds of copaiva, is quite faint, peculiar, and somewhat sour. Its taste is balsamic, but not as acrid or persistent as that of copaiva. Its sp. gr. is 0.955 to 0.975; it is not completely soluble in 90 per cent. alcohol, leaving a small quantity of dusty substance, but is almost completely soluble in absolute alcohol, petroleum-benzin, oil of turpentine, bisulphide of carbon, chloroform, and ether, such solution showing nevertheless slight turbidity. Its solutions in equal volumes of petroleum-ether and benzol are nearly clear; but in 4–6 volumes of these solvents it becomes decidedly turbid, from the deposition of the crystals of a peculiar acid, named by Werner,

Gurjunic Acid.—This can be detected floating in the balsam, when the latter is placed under the object-glass of the microscope, and it is to this that the slight turbidity of the balsam, as well as of its solutions, is due. Besides this acid the balsam contains 55–65 per cent. of volatile oil, and 35 to 45 per cent. of a hard brown resin. The volatile oil is readily separated by distillation with water. Ph. Centralhalle, No. 30, 1875, p. 249.

Prof. Flückiger has found that the volatile oil of Gurjun balsam, when dissolved in about 20 parts of bisulphide of carbon, affords, upon the addition of a drop of a cold mixture of equal parts of concentrated sulphuric and nitric acids, a magnificent violet color. A single drop of the oil answers to produce this reaction, and since it may be made with Gurjun balsam direct, and even when this is mixed with eight times the quantity of balsam of copaiva, the reaction will serve for the detection of Gurjun balsam in copavia. Gurjun balsam, being obtained from a large variety of the Dipterocarpus species, it is quite possible that some varieties of Gurjun balsam may fail to produce this reaction. Moreover, under the name of "wood oil," which is commonly applied to Gurjun balsam, various oils and oleo-resins obtained from different plants, are known in commerce, such as the balsam of *Hardwickia pinnata*, Roxb., the oil of the seeds of Aleurites cordata (Elæcocccá vernicia, referred to elsewhere), and these might, under circumstances, occasion confusion in the application of the test. Arch Pharm., May, 1876, p. 420.

ERYTHROXYLACEÆ.

Erythroxylon Coca.—P. L. Simmonds reviews the literature of the coca leaf of South America, which has again become the subject of discussion and inquiry. The Indians of various South American countries, particularly of Peru and Bolivia, indiscriminately chew the coca leaves, the exciting and tonic properties of which enable them to withstand famine, thirst, want of sleep, and to support excess and fatigue night and day. The coca plant is described by Castlenau as a bush which rarely attains six feet in height, and does not often exceed three. Its foliage is bright green, its flower white, and its fruit small and red. It is indigenous to Bolivia, but is cultivated to a great extent, the annual production amounting to 30,000,000 lbs. When the plants are about eighteen inches high, they are transplanted from the seed-beds into fields, called cocales. The mature leaves are gathered with the fingers, are dried by spreading them in the sun, sometimes on woollen blankets, and the operation requires great care, for the plant must be protected from all dampness, which changes its color, and thus diminishes its value. It is then packed in bags, weighing 50 to 150 lbs. Its odor is that of hay with which there is a quantity of milfoil. A decoction of the leaves has long excited attention in France as possessing a peculiar stimulating power, and favoring digestion more than any other known beverage, and a tonic wine and an elixir are made from them. It seems to be admitted that the leaves, chewed in moderate doses of from four to six grains, excite the nervous system, and enable those who use them to make great muscular exertion, and to resist the effects of an unhealthy climate, imparting a sense of cheerfulness and happiness. In larger doses it is alleged that coca would occasion fever, hallucinations, and delirium. Its exciting power over the heart is twice that of coffee, and four times that of tea. An opportunity for analyzing coca in its fresh condition, and more accurate and detailed information as to how long it retains its asserted invigorating and sustaining properties, seems desirable. The Ch. and Drug., April 15th, 1876, p. 112.

In the May number of the same journal (p. 155), Mr. Simmonds furnishes some additional notes on the subject of coca, from a monograph by Manuel A. Fuentes, published in 1866. This gives additional and, in some respects, conclusive evidence of its value as above claimed, together with some interesting points regarding its collection, preparation for the market, and method of use. Señor Fuentes asserts, that, when taken in form of tea, it excites perspiration, and soothes those who suffer from asthma. Taken either in infusion or chewed, it assists the functions of the stomach, removes obstructions, and cures gripes or colic. Applied externally in friction or plaster, it allays rheumatic pain caused by the cold.

He also states that it cures intermittent fevers, and that it is a protection against syphilis. It is said also to strengthen the gums and teeth. The papers of Mr. Simmonds are calculated to draw more general attention to a South American product, which, in view of the many and remarkable virtues claimed for it, it is strange that it has not found its way more generally beyond the countries in which it is produced.

The accompanying illustration (Fig. 29) is an accurate representation of the shrub, showing its inflorescence. No. 1 shows the entire flower; 2, the calyx; 3, the petals, with the scales of the nectary; 4, the stamens united at the membrane which encircles the ovary; 5, the same united at the open membrane; 6, the pistil, with the three styles; 7, the drupe or entire fruit; 8, the nut with the envelope removed; 9, the same cut transversely. Ibid., June 15th, 1876, p. 217.

FIG. 29.

MELIACEÆ.

Constituents of Mahogany-wood.—The ethereal extract of the sawdust, deprived of its hygroscopic water, yielded, according to Latour and Cazeneuve, a considerable quantity of catechin to boiling water. The exhausted sawdust yielded to cold water a red-brown extract, which contained, besides catechin, a yellow coloring matter, and an astringent principle analogous to catechuic acid. To alcohol the sawdust now yielded a red acid principle, which dissolves in alkaline carbonates with a purple color, and resembles in its properties rubinic acid and cinchonic red. Hot water extracts from the sawdust 12 per cent. of dry extracts, of which nearly one-half is soluble in cold water. By macerating the sawdust in cold water 6.5 per cent. of dry extract is obtained, which is readily soluble in water, while by percolation 8.5 per cent. of dry extract is obtained, which is not entirely soluble in water. The catechin has the composition and properties ascertained by Zwenger, and it seems probable that the extract of mahogony-wood has the same composition, and may be substituted for catechu. A. J. Ph., September, 1875, p. 396; Rép. de Ph., 1875, p. 417.

POLYGALACEÆ.

Seneka.—The variable condition in which seneka root occurs in commerce has induced C. Schneider to make a series of experiments with a view to determine what part of the root contains the largest quantity of active constituents. Reviewing the results of the principal experimenters, he arrives at the conclusion that the activity of seneka root is due to polygalic acid (senegin), soft resin, and hard resin, as originally maintained by J. B. Trommsdorff (Pharm. Centralblatt, June 30th, 1832), and that the process of the Ph. Germ. for the preparation of the extract* insures the extraction of all of these, and, consequently, their representation by the extract. A sample of seneka root was sorted so as to represent the four following parts:

1. The finest roots (fibrils), which composed 6.400 per cent.
2. The thick roots (of the thickness of goose-quills), which composed 12.800 per cent.
3. The root-heads (to which were attached remnants of the stalks), which composed 34.933 per cent.
4. The medium-thick roots (diameter 2 to 3 millimetres), which composed 45.866 per cent.

From the parts so separated the author prepared extracts according to the process of the Ph. Germ.; these extracts were reduced to a fine powder, extracted with cold ether until they were exhausted, and the residue was then completely extracted by boiling alcohol of sp. gr. 0.830. The residue then remaining was in all instances rapidly and readily soluble in water. The *ethereal solution*, when evaporated and the residue dried at 110° C. (= 230° F.), represented the resins, and contained besides, fat, wax, and coloring matter. The *alcoholic solution*, which deposited on cooling a granular substance, was filtered while warm, evaporated to dryness, the dry residue dissolved in water, precipitated with baryta water in excess, and the precipitate, dried at 110° C. (= 230° F.),

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* The extract of the Ph. Germ. is directed to be made by maceration in two successive portions of diluted alcohol and subsequent evaporation to dryness.

represented the senegin in combination with baryta. The following tables show the results:

I. The Root.

	Extract. Parts.	Senegin. Parts.	Fat, Resin, etc. Parts.
1. 6.400 parts of Fibrillæ contain	1.696	0.1570	0.0481
2. 12 800 " Thick Roots "	3.848	0.1162	0 0884
3. 34 933 " Root-heads "	10.080	0.2523	0 3122!
4. 45 866 " Med. Roots "	15.851	0.5199!	0.2976
99.999 parts of the root contain	31.475	1.0454	0.7463
1. 100 parts of the Fibrillæ contain	26.500	2.4539	0.7520
2. " " " Thick Roots "	30.063	0.9079	0.6910
3. " " " Root-heads "	27.786	0.7960	0.8940
4. " " " Med Roots "	34.561	0.8806	0.6490

II. The Extract.

	Senegin. Parts.	Fat, Resins, etc. Parts.
1. 5.978 parts extract from Fibrillæ contain	0.5539	0.1697
2. 12.672 " " " Thick Roots "	0.3826	0.2914
3. 31.655 " " " Root-heads "	0.8230	1.0192!
4. 49.695 " " " Med. Roots "	1.5299!	0.9342
100.000 parts of extract from entire root contain	3.2894	2.4145
1. 100 parts of extract from Fibrillæ contain	9.2600	2.840
2. " " " Thick Roots "	3.0200	2.300
3. " " " Root-heads "	2.6000	3.220
4. " " " Med. Roots, "	3.2800	1 880

The above results show that the fibrils contain by far the largest percentage of senegin, but they bear a very small proportion to the seneka root. On the other hand, the root-heads, which amount to about 33 per cent. of the entire root, contain the largest proportion of resins, fat, etc., and the smallest proportion of senegin. These two constitute, however, only about 41 per cent. of the entire root, the remainder being made up of thick and medium roots, each of which contain about the same proportions respectively of senegin and of resins. If the entire root is employed the large excess of senegin in the fibrils more than compensates for the deficiency in the root-heads, while the latter considerably raise the average of resins, fats, etc., over that contained in the medium root, which constitutes nearly 46 per cent. of the whole. The large percentage of senegin contained in the fibrils is evidently owing to the fact that they are composed mainly of cortical matter. Trommsdorff had obtained from the bark of the seneka root nearly 30 per cent. of senegin and 9 to 10 per cent. of fats and resins. Arch. Pharm., November, 1875, pp. 395–411.

Patrouillard has observed a parcel of senega which was adulterated to the amount of one-sixth of its weight with the root of *Asclepias Vincetoxicum, L.* The latter may be distinguished from the senega by the regularity of the rootlets, which are attached to a very short root-stock, to which occasionally a portion of the hollow stalk is attached, and which are also occasionally united by means of a subterranean stem, of varying length, in clusters of two or more. The secondary roots of the asclepias are more difficult to distinguish, but are recognized by their cylindrical and straight linear form, and their handsome white color. The taste of the asclepias root is at first insipid, and becomes subsequently somewhat acrid ; its odor assimilates somewhat to senega (?) ; the infusion has the same color and appearance as that of senega, and when shaken it froths like the latter, but the froth subsides in one-sixth the time. When a little conc. solution of chloride of iron is added to the infusion of the asclepias root, no change of color takes place, but a copious precipitate is produced, and after a few days, when it has completely settled, the infusion shows a faint yellow color. Infusion of senega under the same conditions becomes dark-red and faintly turbid, and when it has settled clear, after the lapse of a few days, it shows a violet color. Zeitschr. Œst. Ap. Ver., No. 29, 1875, p. 474.

Krameria.—Prof. F. A. Flückiger draws attention to a variety of rhatany, which under the name of *Ceará rhatany*, has been lately introduced into German commerce, a large shipment having been made to a Hamburg house from the Brazilian province of Ceará. This variety seems to be inferior to the officinal variety (K. triandra), is evidently identical with the so-called *Para rhatany*, and may be distinguished from the latter by its difference in color, which is yellowish-brown ; while that of the *Payta* (officinal) *rha-*

tany is red, and a third, also inferior variety, occasionally found in European commerce, the so-called *Savanilla rhatany*, is of a violet hue.

Para or *Ceará rhatany* is also known as *Brazilian* rhatany, and is in all probability derived from *Krameria argentea*, *Mart.* Its alcoholic tincture, when diluted, has a pure yellow color, and affords a distinct violet precipitate with subacetate of lead.

Savanilla rhatany, also known as *Rhatania Granatensis*, is derived from *K. tomentosa*, St. Hilaire. Its alcoholic tincture diluted to the same extent as the above, has a yellowish color with a greenish tinge, and subacetate of lead produces a violet-colored precipitate.

The diluted tincture prepared from the officinal rhatany root, on the contrary, has a distinct reddish color, and with subacetate of lead affords a red precipitate. Schw. Woch. Schr. f. Ph., No. 26, 1875, p. 216.

PAPAVERACEÆ.

Persian Opium.—W. D. Howard has examined a sample of fine Persian opium, which had been sent to England as "perfectly pure." The opium was light-brown in color, and had been collected without the excessive use of oil. On analysis it yielded, not previously dried:

Morphia, crystallized from alcohol,	10.40	per cent.
Codeia (anhydrous),	0.29	"
Narcotina,	2.50	"
Thebaina,	0.57	"
Cryptopia,	0.09	"
Papaverina,	trace.	

Ph. J. Trans., March 11th, 1876, p. 721.

Persian Opium, which had been offered at about one-third the price of good samples of the same drug, was examined by Barnard Procter, who found it to contain but 0.25 per cent. of morphia. Ph. J. Trans., June 24th, 1876, p. 1024.

Opium.—Ad. Starting has recently examined a lot of opium, which had the external characteristics of the best Smyrna opium, with the exception that the interior was very hard, nearly brittle. By Schacht's method for determining morphia it proved to contain but 7.5 per cent. Arch. Ph., April, 1876, p. 339.

J. Clark Moss has assayed five commercial samples of opium by

Staples's process as modified by Procter (see Proceedings, 1870), with the following results:

	Water.	Morphia.
No. 1, ...	9.84 per cent.	8.94 per cent.
" 2, ...	5.80 "	7.56 "
" 3, ...	7.26 "	10.92 "
" 4, ...	9.77 "	12.53 "
" 5, ...	——	9.25 "

For comparison the author assayed some of the samples by other recognized methods. Thus No. 5 yielded by Hager-Jacobsen's process (see Proceedings, 1874, p. 142) 9.89 per cent., an increase of 0.64 per cent. over Staples's process. By the process of Flückiger and Hanbury ("Pharmacographia," p. 59) he obtained from No. 1 10.34 per cent. of crude morphia, against 8.94 per cent. of a much purer morphia by the process of Staples. The author gives preference to the process of Hager and Jacobsen, both because of its good results and because it is completed in a shorter time than the others.

Two samples of *American opium* were also examined; one of them containing mere traces of alkaloid, the other none at all. The latter was marked "Wilson's American Opium." Neither of them had the appearance, odor, or taste of opium, being much darker in color, and having an odor resembling that of tobacco and licorice. A. J. Ph., October, 1875, p. 460.

Fallacy of the Sulphomolybdic Acid Test for Morphia.—In his report to St. Bartholomew's Hospital, London, 1874, Dr. Regnald Southey highly recommends sulphomolybdic acid for the direct determination of morphia in solutions containing opium. The reagent produces a deep maroon color when the opium solution comes in contact with a strong solution of molybdic acid in sulphuric acid, and this color changes, becoming first deep purple, then gradually loses its red element, and changes finally to a bright blue. The color is due, according to the author, to morphia solely, meconic acid playing no part in the reaction, and is produced in presence of the minutest quantities of the alkaloid. Henry S. Wellcome regrets that this test should have the recommendation of one whose position should warrant authority and reliability, since the test is entirely fallacious. It is *not* characteristic of morphia at all, many organic bodies yielding the same coloration, and the presence of other organic matter *does* materially interfere with the reaction, Dr. Southey's statement to the contrary notwithstanding. The maroon color is caused by the red color, produced with morphia and other bodies by the action of the sulphuric acid, which is modified by the blue hydrate of molybdenum, formed by the reduction of molybdic acid when brought in contact with certain organic matters; the variable green color is produced by blending with the yellow color given to many organic bodies by the action of sulphuric acid; and when a red, yellow, or brown coloration is produced with an organic principle, the sulphuric acid alone takes part in the reaction. Am. J. Ph., January, 1876, p. 21.

Prof. Albert B. Prescott, in a note on Frœhde's Reagent as a test for morphia, makes some supplementary and complimentary remarks on the above paper, which in the main correspond and support the views of Mr. Wellcome. The observation, that morphia with concentrated sulphuric acid gives a wine color, is correct as far as commercially pure samples of morphia and so-called C.P. sulphuric acid are concerned. Whether these substances in an absolutely pure condition are likely to produce that or a similar color remains an open question. It should be remarked that the author finds different shades of color to result with different samples of morphia, so that the term "wine color" is only relative. A. J. Ph., February, 1876, p. 59.

Opium Preparations of the B. P.—Errors in the stated Strengths and Doses.—E. B. Shuttleworth draws attention to some discrepancies and inconsistencies in pharmacopœial statements, and among these mainly to the omission and errors in the table, under the head of *Opium*, in the edition of the British Pharmacopœia of 1867 (p. 230). The author appends an enumeration of the nearest quantities of the officinal preparations of opium which are equal to one grain of dry opium, the amount of moisture in ordinary opium being taken at 15 per cent.:

Confectio Opii, . .	40.3 grains.	Pulv. Ipecac. Co., . .	10 grains.
Emp. Opii, ...	10.0 "	Pulv. Kino Co., . . .	20 "
Enema Opii, . . .	1 ounce.	Pulv. Opii Co., . . .	10 "
Ext. Opii, ...	0.588 grains.	Tinct. Opii Camph., .	½ f℥.
Ext. Opii Liquid., .	12.8 ♏.	Tinct. Opii, ...	14.6 ♏.
Lin. Opii, ...	30.0 ♏.	Tinct. Opii Ammon., .	96.0 ♏.
Morphiæ Hydrochlor.,	$\frac{1}{10}$ grain.	Troch. Opii, ...	5 8 troch.
Pil. Ipecac. c. Scillæ,	24 grains.	Vinum Opii, ...	12.8 ♏.
Pil. Plumbi c. Opio,	8 "	Supposit. Plumbi Co., .	1 supp.
Pil. Saponis Co., . .	6 "	Ung. Gallæ c. Opio, .	14.6 grains.
Pulv. Cretæ Arom. c. Opio, ...	40 "		

Can. Ph. Jour., December, 1875, p. 156.

Chelidonium Majus.—Alkaloidal Strength at different periods of Vegetation.—E. Masing has made a series of experiments to determine the influence of different periods of vegetation on the alkaloidal strength of this plant, by which he has found a steady decrease in the quantity of alkaloid during the commencement of the flowering period and a steady increase after that period; the young herb collected in autumn also shows a steady increase. The short intervals between the examinations did not permit the separate determination of the two alkaloids, chelidonia and chelerythria (sanguinarina), and they were therefore determined together, as follows: 10 grams of the finely cut stems, leaves, and flowers, or of the root or ripe capsules, were digested for twelve hours on a steam-bath with a mixture of 25 cubic centimetres of acidulated water and 75 cubic centimetres of alcohol; the alcohol was then evaporated and the residue brought to the measure of 100 cubic centimetres with water. The alkaloid was then determined in the filtrate by Mayer's solution of iodohydrargyrate of potassium. The author's results are given in a tabulated statement comprising forty-nine determinations, and cover a period of about five months, from May 1st to October 13th, 1874. Besides the amount of alkaloid contained in the various parts of the plant at different periods of growth, the loss of weight by drying is also stated. Arch. Ph., March, 1876, p. 224.

CISTACEÆ.

Labdanum.—The mode of collecting the resinous exudation of several species of Cistus—C. creticus, balsamiferus, villosus, etc.—in Crete, is, according to Landerer, the same now as it was carried on in ancient times, and has been correctly described by Tournefort. A curious instrument, called labdanisterion, is employed, which has on one end a number of narrow leather bands, by means of which the resin is scraped off. An inferior kind is obtained by boiling from the wool and hair of sheep and goats which feed on the plants, this kind being called *labdanum e. barba;* it is often sophisticated during the melting process with olibanum, mastich, and other resins. A. J. Ph., November, 1875, p. 499.

ILLECEBREÆ.

Herniaria Glabra.—Analysis of Ash.—Dr. G. C. Wittstein has determined the ash, and its constituents, of the flowering plants grown on different soils; the one on sandy the other on dolomite soil. The total quantity of ash yielded by the air-dried plant was:

Sandy soil.	Dolomite soil.
7.132 per cent.	6.622 per cent.

And the composition of the respective ashes:

	Sandy soil.		Dolomite soil.	
Potassa, ...	24.380	per cent.	8.680	per cent.
Soda, ...	4.110	"	3.860	"
Sodium (as Chloride), .	1.702	"	0.691	"
Lime, ...	14.349	"	30.400	"
Magnesia, . . .	6.300	"	14.839	"
Alumina, . . .	1.321	"	1.755	"
Oxide of Iron, . .	1.038	"	0.430	"
Protoxide of Manganese,	.....		.....	
Chlorine, . . .	2.624	"	1.066	"
Sulphuric Acid, . .	1.717	"	1.746	"
Phosphoric Acid, . .	9.729	"	8.421	"
Silicic Acid, . . .	14.445	"	6.367	"
Carbonic Acid, . .	17.694	"	21.505	"
Total, . . .	99.409	"	99.760	"

Arch. Ph., April, 1876, p. 342.

CUCURBITACEÆ.

Cucurbita Pepo.—Active Components of the Seeds.—Heckel has recently made some physiological experiments with pumpkin seeds, and finds that the membrane surrounding the embryo had the power of expelling tapeworms, when given in half-ounce doses, preceded and followed by castor oil; while about six ounces of the perisperm, tegmen, and testa, given in the same way, failed to expel the tapeworm. The membrane was carefully examined, and was found to consist of two membranes, separable by maceration with water, of which the outer membrane contains a resin (about 1 to 17), which the author believes to be the active constituent; while the inner membrane contained more chlorophyll than resin. He believes that the castor oil not merely acts as a purgative but also by dissolving the resin. The fixed oil, of which half an ounce may be obtained from one pound of seeds, has also been used with success, in half-ounce doses, in cases of tænia. Ph. Jour. Trans., October, 1876, p. 308; from the Lancet.

Tayuya.—Under this name a new drug from Brazil has been introduced in France, and is at present under trial by Dujardin Beaumetz for the treatment of syphilis, for which it seems to be used—on the authority of Ubicini, a naturalist—amongst a Negro tribe. The plant from which the drug is obtained seems to answer in the description given to a specimen of *Bryonia Tayuya* in the Herbarium of the Natural History Museum of Paris. Tayuya, Tayuia, or Taguga, appears to be the vulgar generic name of certain cucurbitaceous plants of the genus *Bryonia*, but there is considerable doubt, according to Stanislas Martin, as to the species to which the plant possessing the medicinal virtues now claimed should be referred. As seeds have been sent to France the matter will doubtless be settled ere long. The root is the medicinal part, but as it occurs in small pieces it is difficult to describe its general character; it is said, however, to be elongated and tuberous-napiform (Martin). 14 drops of a tincture prepared from the root (?) are stated to be a maximum dose; the commencing dose being one drop, and increasing progressively.

Under the synonym *Trianosperma*, Martius apparently describes the same series of cucurbitaceous plants as those above referred to. Of *Trianosperma Tayuya* he says: It is in small doses emetic, in larger drastic; it is useful in malignant, gastric, and putrid fevers; in the bites of serpents, in syphilis, in dropsy, and in obstructions of the abdominal viscera; it is peculiarly efficacious in affections of the liver, gout, amenorrhœa, mania, melancholia, epilepsy, elephantiasis, etc. He also gives directions for its use in powders, pills, lotions, and poultices, and gives an account of its proximate constituents. Ch. and Drug., January, 1876, p. 20.

Stanislas Martin describes the root as received in Paris to consist of pieces, which are transverse sections, 2 to 3 millimetres thick and varying in circumference, that of the largest being 12 centimetres. The color both of the exterior and interior is analogous to that of fennel-root. The interior resembles a star with rays converging to and becoming narrower towards a common centre. Each division has the appearance of projecting, and in the larger roots ten rays have been counted. 10 grams of the root displaced 12 grams of water and absorbed 19. In a longitudinal section of the green root the cells would probably be seen full of water of vegetation; for in a dried specimen under the microscope the cavities seem to be deep and ranged like those in a honeycomb.

The proximate analysis determined in eight experiments the absence of an alkaloid. It does contain a green resin, a citron-yellow fatty matter, a very bitter and strongly aromatic extractive matter, tannin, mucilage, traces of glucose, starch, volatile oil, magnesia, lime, iron, potash, and lignin. The mineral substances are so abundant that they appear as a white powder when an aqueous decoction slightly acidulated with acetic acid is concentrated. An aqueous solution or alcoholic tincture is prescribed, the latter being prepared as follows:

Tayuya-root, reduced to powder, 337 grams; alcohol 80 pr. ct., 1000 grams. Macerate for a fortnight, stirring from time to time, and filter through paper. This is called the "mother tincture," and if required for internal administration it is reduced with four times its volume of rectified spirit, the dose being 1 to 14 drops per day. The root requires to be collected at a particular season, and dried with care, or its activity is impaired. Ph. J. Trans., November 20th, 1875, p. 401; from l'Union Pharm., October, 1875.

TURNERACEÆ.

Damiana.—At a meeting of the New York Alumni Association of the Philadelphia College of Pharmacy, Mr. Wellcome exhibited some specimens of damiana, which appears to occur in three distinct varieties. A sample obtained from Messrs. Helwick & Co. is a smooth, dark-green, broadly lanceolate leaf, usually having six teeth on each side, heavy midrib and ribs extending to the point of the teeth, from two to five lines in width and from six to twelve in length; the stem is red and woody, and the leaves give a minty flavor when chewed. A variety of damiana, received from San Francisco, also claims to be derived from Mexico. It is a light-green, deeply-toothed leaf, having three, and occasionally four teeth on each side, with a heavy midrib, and branching ribs extending to the edge. The surface is rough, and both sides are covered with short white hairs; is from two to five lines in width and five to eight in length. Its flavor, when chewed, reminds of sage; the stem is woody, and near the apex it is quite hairy. A third specimen was found in the New York market. The leaf is light-green, lanceolate, three teeth on each side, which terminate with hard, sharp points; it has a distinct midrib, and is rather indistinctly veined; is from one and a half to three lines in width and four to ten in length. To the naked eye the leaf appears to be covered with shining scales, which under the lens appear as minute resin-like globules. This specimen is the only one accompanied by flowers. They are compound, with yellow florets and white pappus; the stem is woody, with green epidermis, and covered with a resinous exudation which is distinctly balsamic in odor and taste. Which of the three varieties is the true damiana remains to be determined. A. J. Ph., Nov. 1875, p. 518.

A quantity of damiana, similar to the third variety mentioned above, was made into fluid extract by Prof. Wayne, by exhausting with 76 per cent. alcohol. The filtered preparation deposited, after several days' standing in glass vessels, an abundance of crystals, which upon examination proved to be chloride of potassium. A. J. Ph., Jan. 1876, p. 23.

E. M. Holmes, who was placed in possession of three samples of "damiana" by Prof. Bedford, of New York (the three varieties above mentioned), was struck with the resemblance of the San Francisco variety, in its external character, taste, etc., with a drug which had been submitted to him for examination by Messrs. Allen & Hanbury of London. The sample of San Francisco damiana consisted only of the leaves, whilst the drug in Mr. Holmes's possession contained two flowering stems, and upon examination proved to belong to the genus

Turnera, of the natural order *Turneraceæ*. The San Francisco damiana was found to be identical with this, and the source of damiana may therefore be considered to be established. Messrs. Allen & Hanbury's specimen shows that the plant is from two to three feet high, much branched, the stem being woody and suffruticose, and the branches erect from a curved base, cylindrical, with a smooth, reddish-brown bark; the branches all being downy towards the apex. The leaves are alternately arranged on the stem, and are hairy on both sides, the under surface being most so. Since they readily fall off, the dried stems bear some resemblance to broom tops, except in color. The root is nearly half an inch in diameter, yellowish-white, long and tapering, and unbranched, the bark of the root being remarkably soft and spongy. The flowers are sessile, about a half-inch long, solitary in the axils of the leaves at the apex of the stem; bracts two, lanceolate concave, hairy externally, glabrous within; calyx monosepalous, with a short tube attached to the calyx; pale, obovate, unguiculate, with five oblong acute teeth, hairy externally; petals five, reddish forked veins; stamens five, opposite the sepals; filaments subulate, flat, and winged; anthers innate, two-celled, apiculate; ovary hairy, with three distinct styles, longer than the stamens; stigmas toothed, placentation apparently parietal. The young state of the flowers did not permit the author to ascertain with certainty either the placentation, the character of the petals, whether erect or spreading, or their original color. The species which the plant more nearly approaches is

Turnera Microphylla, D. C.—The sample was contained in a chest, which, it is probable, is the one alluded to (Ph. J. Trans., Dec. 1875, p. 493) by Mr. A. McIntosh, of Rothesay, as having been brought over from South California, by Captain Hugo Müller, of Copenhagen. Helmich's damiana differs only in the leaves being smooth instead of hairy, and is probably only a glabrous variety of the same species of *Turnera*. The third variety (that found in the New York market) is a composite plant, doubtless *Aplopappus discoideus*, D. C. Ph. J. Trans., Jan. 22d, 1876, p. 581.

The third kind of damiana, above alluded to, has, by Dr. J. T. Rothrock, of Wilkesbarre, Pa., been also recognized as *Aplopappus* (*Haplopappus*) *discoideus*, D. C. He gives the following synonyms for the plant: *Linosyris Mexicana*, Schlechtendal; *Baccharis veneta*, Humboldt, Bonpland and Kunth; and *Bigelovia veneta*, Gray. It is a common plant in Mexico, and another closely allied species, which by some is considered identical with the preceding—*Bigelovia Menziesii*, Gray—is found in California and Arizona. Prof. Gray has confirmed these conclusions. A. J. Ph., June, 1876, p. 274; from Phila. Med. and Surg. Rep., March 4th.

MYRTACEÆ.

Myrtus Communis.—Delioux de Savignac calls attention to the claims which the common myrtle has as a therapeutic agent. The plant abounds in essential oil and tannin, and of the latter contains a greater abundance than any of the more popular remedies derived from the *Myrtaceæ*, with the single exception of the clove. It is the only representative of the myrtle family in Europe, and flourishes only in the southern portions, particularly on the borders of the Mediterranean. The leaves, flowers, and fruits are perfumed with the volatile oil, which is of a greenish-yellow color, and is principally distilled from the leaves. It probably belongs to the class of oxygenated oils, differs from most oils in becoming lighter by age, and possesses the odor of the plant with a slight odor of turpentine. Piesse obtained 150 grams from 50 kilograms of the leaves. The berries and bark, as well as the leaves, contain an abundance of a very energetic tannin, and the berries, in addition, a fixed oil. The plant also appears to contain a bitter principle (not an alkaloid), and one or more resins. The author gives preference to the leaves for pharmaceutical purposes, as they contain the most uniform quantities of essential oil and tannin, and gives formulas for infusions, decoctions, tinctures of the leaves, bark, and berries. The infusions are made in proportion of 15 or 30 grams of the substance to a litre; the decoction, 1 part to 30, to 60 or 100 parts; the tincture, according to the proportions adopted by the Codex for such preparations. The dose of the powdered leaves is 1 to 2 grams. Ph. J. Trans., October 30th, 1875, p. 346; from Rép. de Pharm., 1875, p. 633.

Eucalyptus Globulus.—Prof. E. S. Wayne has been unable to obtain a fluid extract of eucalyptus that would not in a short time form a copious chlorophyll-like precipitate. Operating suitably, he separated from this precipitate a crystalline substance having the peculiar odor of the leaves, and when powdered a pale-ochre tint. The substance appears to be resinous in its characters, is soluble in ether, chloroform, and alcohol, and gives a brown-red reaction with ferric chloride. A. J. Ph., January, 1876, p. 23.

R. D. Glover communicates a result attendant on the cultivation of the eucalypts, which seems to prove the high value of these trees for rendering malarial districts habitable. About six years ago, some Trappist monks sought and obtained permission to occupy some old monastic buildings, which were situated in one of the worst malarial districts of the Campagna, on a spot called St. Paolo a le trè Fontana. They immediately planted some eucalypts, and these throve to such an extent that they have now developed into trees over thirty feet high. Until after the fourth year the monks did not venture to sleep in the buildings during the summer and fall of the year, but since then they inhabit them throughout the year without the least inconvenience from malaria. It must be remarked, however, that they prepare an essence from the leaves of the plant, a portion of which is taken by them with their morning coffee. Ph. J. Trans., February 5th, 1876, p. 625.

ROSACEÆ.

Prunus Armeniaca.—According to X. Landerer, the pulp of the apricot is, in the island of Cyprus, spread upon marble, dried, and is then rolled up like cloth, and preserved. The preparation is called *Kaissopyta*, and is eaten during the winter in place of fruit, pieces being cut off with shears. It is exported to Alexandria, and occasionally also to Constantinople. A. J. Ph., December, 1875, p. 534.

LEGUMINOSÆ.

Balsam of Peru.—The adulteration of balsam of Peru by castor oil (and other fixed oils) is detected, according to G. C. Racher, by quickly triturating 10 drops of the suspected balsam with half a fluid drachm of sulphuric acid for one minute, then adding half a fluid ounce of water, and continuing the trituration for two minutes longer. The resulting black mass, when drained in a filter, hardens quickly, and becomes brittle in an hour if the balsam is pure ; while, if it contains castor oil, it remains sticky and tenacious, resembling soft black pitch. A. J. Ph., April, 1876, p. 166.

Detection of Alcohol in Balsam of Peru.—A. Gawalovski finds that the presence of alcohol in the black balsam of Peru of commerce is readily determined by treating a small portion with solution of bichromate of potassium followed by concentrated sulphuric acid. The aldehyd formed is readily recognized by its odor, which the peculiar aromatic-ethereal odor natural to the balsam is unable to disguise. Ph. Centr. H., No. 32, 1875, p. 265.

Anagyris Fœtida.—The leaves of this leguminous tree possess purgative properties, and are employed by the peasantry of Greece like senna, under the name of "pseudo-sinamiki," false senna leaves. When the leaves are rubbed between the fingers, their offensive odor is developed, which is likewise perceived when the tree is shaken either by hand or by the wind. The fruit having a resemblance to beans, they are called agriophaselo, or wild beans, in the island of Cyprus. Prof. X. Landerer, in A. J. Ph., May, 1876, p. 195.

Senna Extracted by Alcohol.—L. Siebold communicates the results of some experiments made to determine the effect of senna which has been exhausted by alcohol, and of the components represented by the alcoholic extract. He finds that while alcohol does not extract any portion of the purgative constituent (cathartic acid), the so exhausted senna nevertheless is less active ; 3 parts being required to produce the same purgative action that 2 parts of the unextracted senna are capable of producing. The alcoholic extract has no purgative action, and produces but slight griping ; but when taken along with an infusion of the extracted senna, the action of the latter was increased, so as to be equal to that of the unextracted senna. He infers therefore that the therapeutic action of the cathartic acid is assisted by one or more of the constituents yielded by senna to strong spirit. Considering that senna exhausted by alcohol is a reliable and pleasant purgative, although somewhat weaker than the unextracted leaves, such a preparation merits more attention than has hitherto been accorded to it. Ph. J. Trans., December 4th, 1875, p. 445.

C. Lewis Diehl draws attention to the readiness with which senna leaves may be deprived of their odor, taste, and griping qualities, by extracting them with strong alcohol, as determined by Buchheim and others, and gives formulas for preparing a fluid extract, a simple and a compound elixir. He recommends that Tinnevelly senna should be used, Alexandria senna not being so well suited (see Fluid Extract and Elixirs). Am. Practitioner, December, 1875, p. 325.

Cassia Occidentalis, *L.*—Prof. J. Closset has had occasion to examine some seeds exported from French African colonies under the name of "Negro Coffee." These seeds, which have been used in some countries as a substitute for coffee, are derived from *Cassia occidentalis*, L., a native of India and Cochin China, but are found also in the West Indies and on the African coast. Besides 4.9 per cent. of fatty matters, 0.9 per cent. tannic acid, 2.1 per cent. sugar, 28.8 per cent. gum, 2 per cent. starch, 34 per cent. cellulose, 0.9 per cent. chrysophanic acid, some malic acid, and various salts, the seeds contain 13.58 per cent. of a peculiar substance which has been named *achrosin* (from ἀ + χρώζω, "not coloring"). It was obtained by exhausting the powdered seeds, previously exhausted by ether, with 60 per cent. alcohol, distilling to a syrupy consistence, and treating the syrupy residue with absolute alcohol, which leaves a solid brown-red mass, having when dry a resinous fracture, and dissolving in water with a garnet color. It is also soluble in weak alcohol, in acids, and in alkalies, and contains C, H, O, N, and S.

The whole plant is purgative, which effect is ascribed mainly to the mucilaginous matters and crysophanic acid; 6 grams of the leaves are an average adult dose; a larger dose is liable to produce emesis. The seeds are more active and more rapidly emetic, and are said also to have slight emmenagogue properties. Torrefaction seems to destroy these properties entirely, and an infusion of the roasted seeds is said to approach in flavor and taste very closely to genuine coffee, and as the supply is very abundant, it is not improbable that their use as a substitute for coffee will become extended. One of the most useful properties of the plant is its febrifuge effect. An infusion of the root is by the Indians considered an effective antidote against various poisons. Ph. J. Trans., May 13th, 1876; from New Remedies. Rep. de Ph., 1876.

Cæsalpinia Coriaria.—The curious twisted pods of this plant, which, under the name of *Divi-divi* and Libidibi, are well known in commerce as a tanning agent, for which purpose they are very valuable, as they contain from 60 to 65 per cent. of tannic acid, are employed in India as a medicine, a decoction of the pods being used for hæmorrhoids. The tree was introduced in India from Central America. (J. M. at K.) Ph. J. Trans., Sept. 25th, 1875, p. 241.

Copaiva.—Hager recommends absolute alcohol for the detection of fixed oils as adulterants of copaiva. Pure copaiva generally dissolves clear in the alcohol, or, if it produces slight turbidity, as is often the case with Para copaiva, the turbidity disappears after a time by the settling of a few white flakes. Fixed oil would separate in form of an oily layer. The method may be used advantageously to control the usual method, *i. e.*, to evaporate the copaiva to dryness; he had used it with advantage in determining the adulteration of some copaiva in capsules, which proved to be poppy oil. Ph. Centr. H., No. 39, 1875, p. 329.

An adulteration of copaiva with Gurjun balsam may, according to Hager, be most readily detected by the peculiar behavior of the Gurjun balsam with petroleum ether or with benzol (see "Gurjun Balsam"). By mixing the suspected copaiva with 4 volumes of ether of the above-named solvents, a perfectly clear solution, or at all events but slight turbidity should be produced if it is pure; if it contains any appreciable quantity of Gurjun balsam, a turbid solution is immediately produced, which settles in the course of about a half hour, occupying one half or the entire volume of the adulterant, but finally settling in form of a dense deposit. The occasional turbidity produced in pure copaiva is very slight, and the final deposit is quite distinct from that of Gurjun balsam. Ph. Centr. Halle, No. 31, 1875, p. 257.

Acacia Arabica, Willd.—Gum arabic is produced abundantly in India, but as usually met with, it is dirty and inferior. A sample in the India museum at Kensington, however, shows that selected qualities are scarcely inferior to genuine gum arabic (*Acacia vera*, *Willd.*). The bark is used in India for tanning. (J. M. at K.) Ph. J. Trans., Sept. 25th, 1875, p. 241.

East India Gum.—Externally this gum differs immaterially from Senegal gum, nor is there any material difference in the freshly prepared solutions; but if the solution of East India gum is allowed to stand for a day or two, it becomes quite gelatinous, according to F. Rehm, and is then unfit for use. As it costs only about one-half the price of Senegal gum, it seems a desirable substitute for the latter in calico printing, and Rehm has found that a solution of East India gum which will not gelatinize, may be obtained by allowing the gum to swell in cold water, and then boiling for some time, preferably under pressure of one or two atmospheres. East India gum occurs in round or oval, drop-like pieces of variable size, has a pale yellow or faint reddish tint, is dry and hard, not friable, externally wrinkled, and tasteless. The large brown or red-colored pieces, which always occur in Senegal gum, are never found in this. It is characterized, further, by its aromatic incense-like odor, which is communicated to its mucilage, and of which Senegal gum is entirely devoid. Its solutions are coagulated by nitrate of iron, but the coagulum is redissolved upon the addition of acetic acid. Schweiz. Wochenschr., No. 12, 1876, p. 99.

Algarobia Glandulosa.—A. W. Miller read a paper on "Mezquite gum," at the meeting of the Association in 1875, and exhibited specimens of the gum and of the leaves and fruit of Algarobia glandulosa. The gum, which is collected in the latter part of summer in Mexico and Texas, has been used in the Atlantic cities to some extent, in confectionery; but, owing to the cost of transportation, it can scarcely compete with the lower grades of gum arabic.

Abrus Precatorius, L.—The root is commonly called Indian licorice, from the fact that it possesses the exact taste of the true licorice, and for which it is used as a substitute. The plant yields the pretty scarlet seeds with the black spot at the end, known as prayer beads, and used for necklaces, etc. It is a curious fact that these seeds are sufficiently uniform in weight to be used in India as a standard weight under the name of Rabi. It is stated that the weight of the famous Koh-i-noor diamond was ascertained by means of these seeds. (J. M. at K.) Ph. Jour. Trans., Aug. 7th, 1875, p. 101.

Calabar Bean.—G. W. Kennedy communicated formulas and processes for preparing the extract, fluid extract, tincture, calabarized paper, calabarized gelatin, and the alkaloid physostigmia. Proceedings, 1875.

Laburnum.—The observations made in connection with the poisoning of several boys through eating some laburnum-root, gave evidence that the substance possessed some therapeutic value. These observations of Dr. Vallance seem to be confirmed by Dr. H. J. Hardwicke, who states that he has used the root in form of decoction—a *handful* (!?) of the roots to a quart of boiling water—in "several painful affections," in doses of one ounce of the decoction to an adult. The effects are said to be a feeling of drowsiness followed by deep sleep and profuse perspiration, succeeded on waking by thirst and loss of appetite. There is no nausea or vomiting, and the bowels seem to be unaffected by it; but pain is quickly relieved on its administration. Ph. J. Trans., Oct. 23d, 1875, p. 326.

Entada Pusætha.—According to W. Dymock, the seeds of this East Indian plant, which are known in Bombay under the name of "Pilpapra," are eaten roasted in Soonda. The spongy fibres of the trunk are used, in the form of infusion, for various affections of the skin in the Philippines. In their raw state, the seeds have the reputation of being emetic. The plant producing them is a gigantic climbing shrub, common in the Ghaut jungles, and remarkable for its legumes, which are about three feet long, and four or five inches wide across the seeds. These are more or less heart-shaped, about two inches in diameter, with a shining brown testa, resembling that of the horse-chestnut, but one-sixteenth of an inch in thickness. It incloses two large cotyledons, and thus forms a central cavity. The seed is white and insipid. When a thin section is cut, and a drop of water placed upon it, the water immediately becomes milky, the opacity of the section is much diminished, and under the microscope the milkiness is shown to be caused by oily globules and granular matter from the cellular network of the section. Ph. J. Trans., June 17th, 1876, p. 1003.

ANACARDIACEÆ.

Rhus Succedanea.—Preparation of Japanese Wax.—Henry Gribble, in a communication to the Asiatic Society of Japan, gives the following method of obtaining the vegetable wax from the berries of Rhus succedanea. The tree, called Haji-mo-ki, grows in great abundance on the mountainous declivities of the province of Kinas, and in Higo, Hizen, Simabara, Chikugo, and Chikuzen, the fields are hedged in with it. The berries, ripening in October and November, are gathered, exposed about five days to the sun, and are then stored on straw, and allowed to lay from one to seven (!) years. When they have attained the proper maturity they are deprived of their stems by threshing with flails of bamboo; the oily pulp is then removed from the kernel by pressure between the forefinger and thumb, and the oil removed by steaming the pulp, placed upon a sieve over a kettle of boiling water, and expressing while hot, the press-cake being treated in this manner once more. The expressed fat forms, upon cooling, a coarse, greenish, tallowy mass, which, by remelting in an earthen vessel with water and wood or shell ashes, and then without these, and final exposure for fourteen or fifteen days to sun, assumes the familiar appearance of the commercial article. The yield is about 15 per cent. of the berries used. Arch. Ph., April, 1876, p. 374, from Gehe's Handelsbericht.

W. Dymock describes the *galls* from Rhus succedanea which come to Bombay from Northern India. They are called "Kakrasinghee," have a purely astringent taste, and are probably an efficient substitute for common nutgalls. They are generally single, but sometimes lobed, of a purse-like form, and vary much in size. The average may be,—length half an inch, breadth one inch, thickness one-quarter of an inch. The external surface is of a pale-greenish color, and has a fimbriated appearance. Near the neck or attached end may be seen the midrib of the leaf, from which the gall has been formed; it appears to be split in two; between the halves is a kind of mouth with everted edges, the passage by which the aphides have escaped. The insect obtained from the dry gall is also described. Ph. J. Trans., June 17th, 1876, p. 1003.

BURSERACEÆ.

Indian Burseraceæ.—A. W. Bennet communicates to Pharm. Jour. and Trans. (July 24th and 31st, and August 7th), an interesting paper, in which he gives an account of the botanical characters and economical products of the Indian species of Burseraceæ. The order supplies a variety of valuable fragrant gum-resins, including a large proportion of those used in the worship of the Roman Catholic and Greek churches, as well as to a smaller extent medicinally. This order is distributed over the tropical regions of both hemispheres, the larger proportion in the New World, and comprises about 16 genera, and 160 to 180 species. Some of the products of this order are erroneously attributed to Indian source, as, for instance, the olibanum of commerce, which is mainly exported from Bombay, but doubtless reaches that port from Arabia and other portions of Africa. Various fragrant gum-resins and products are also obtained from American species of Burseraceæ, among them the Mexican Elemi (from *Elaphrium elemiferum*), the Tacamahac resin (from *E. tomentosum*), the "incense wood" (from *Icica Guianensis*), the American Balm of Gilead (from *I. altissima*), etc., etc. The botanical character, habitat, etc., of the following Indian genera and their species, are described in the author's paper:

Boswellia, Roxb.—This comprises about six species, which are natives of India, Arabia, and tropical Africa. *B. serrata*, Roxb., yields a soft odoriferous resin, called "Salai" or "Salah," and has been supposed to yield the olibanum of commerce. The resin, which unlike olibanum remains persistently soft, seems to be used as incense, and is also used medicinally on account of stimulant, astringent, and diaphoretic properties, which it is said to possess.

Triomma, Hook f. Only one species, *T. mallacensis*, is known, and this is not known to have any useful properties.

Garuga, Roxb., comprises from eight to ten species, which are natives of Asia, America, and Australia. The bark of *G. pinnata*, Roxb., is used for tanning, and the leaves as fodder. The fruit is eaten by the natives both raw and pickled.

Balsamodendron, Kunth, comprises six to ten species, which are distributed over tropical Asia, and tropical and Southern Africa. B. Mukul, Hook., yields a fragrant gum-resin, which enters trade under the name of "gugul," gugal, and gugur, and is believed to be the bdellium of classic writers. *B. Roxburghii*, Arn., yields a very similar product, while *B. pubescens*, Stocks, yields, according to Brandis, a tasteless, inodorous, brittle gum, which is almost entirely insoluble in water. *B. Berryi* is a fragrant tree, which likewise yields gum-resin.

Protium, W. and A., comprises three to four species, which are natives of India, Java, and subtropical Africa, and which, according to Wight, never exude resinous juice.

Bursera, Linn., comprises about forty species, the greater number of which are natives of tropical America.

Canarium, Linn., comprises about thirty species, distributed over tropical Asia and the Malayan Archipelago. The boundary line between this genus and the genus Santioia (next following) is quite indistinct, and the species require further investigation. *C. commune*, Linn., exudes, according to Wight, a resin which possesses properties similar to copaiba, while the kernels afford a bland edible oil. The tree is cultivated extensively throughout India on account of the fruit, which resembles an almond in flavor, and on account of the oil, which is used for burning, and, when fresh, mixed with food. Colonel Drury says that the tree is known as the Elemi tree, and that its resinous exudation, which is yellowish-white and odorous, is exported to England from Manila, and is prepared as ointment for indolent ulcers. *C. strictum*, Roxb., yields the black dammar of commerce. *C. Bengalens*, Roxb., exudes an excellent clear, amber-colored resin, not unlike copal, which soon becomes hard and brittle.

Santiria, Blume, comprises twenty-five species, which are confined to the Malayan Archipelago, and all of which, with one exception, are newly described in the "Flora of British India." There is little doubt that this genus, which is badly discriminated from *Canarium*, is possessed of similar properties.

Trigonochlamys, Hook. f. Only one species is known, *T. Griffithii*, Hook, a native of Malacca.

Filicium, Thwaites. Only one species known, and is found throughout the Madras Presidency, and in Ceylon.

Myrrh and its Allied Gum-resins.—W. Dymock includes under this head, true African myrrh, Arabian myrrh, common African bdellium, scented African bdellium, Indian bdellium, and opaque bdellium; all of which are brought to Bombay, from Africa, Arabia, and different parts of India, for selection and dispatch to suitable markets in Europe, China, and other countries. The merchants who deal in myrrh and the gums which come from the northeast of Africa and northern Arabia have their chief houses in Bombay, and employ partners or agents at Aden and Makulla; the Aden agents also attend the great annual fair at Berbera on the opposite coast, and exchange English and Indian goods for myrrh, bdellium, and other African produce. The bags or bales which contain the myrrh, when opened in Bombay, are found to be made up of, first, a large proportion of roundish masses of fine myrrh; second, a considerable proportion of small semitransparent pieces of myrrh of irregular shape; third, numerous pieces of dark-colored myrrh, mixed with bark and other refuse; fourth, a small proportion of an opaque gum-resin (*Bdellium opaque* of Guibourt?); occasionally pieces of resin (Juniper?) are also met with. In Bombay the contents of the package are sorted; the best myrrh goes to Europe, the darker pieces form a second quality, and the refuse is exported to China, where it is probably used as incense. From Berbera also comes bdellium. In the bales of this drug two distinct kinds are met with, viz., ordinary, and a perfumed kind in small quantities. The latter occurs in irregularly-shaped pieces, more or less flat, some of them having fragments of thick bark adherent, but not the birch-like bark which commonly adheres to bdellium. The color of the gum is dark reddish-brown; but opaque yellowish-white streaks are frequently met with in the semitransparent reddish mass which forms the bulk of the drug. The odor, on fresh fracture, is powerful and pleasant, not unlike lemon lollipop. From Makulla and Aden another kind of myrrh is received, the Arabian myrrh of the Pharmacographia. The trade name of the drug in Bombay is meetiga; it is mostly sold in India as true myrrh, for which it might easily be mistaken by any one not especially acquainted with drugs. The author is assured by the dealers that no true myrrh is ever received from Arabia. Indian bdellium appears to come chiefly from Deccan, and somewhat resembles in general form and appearance the African drug, the pieces often having portions of papery bark attached to them; but the color is different, being greenish, and the odor though similar is more faint. Ph. J. Trans., February 19th, 1876, p. 661.

JUGLANDEÆ.

Chinese Walnuts.—The Abbé A. Dewis has recently reported on Chinese walnuts without shells, which grow in some localities of the province of Peking. Some of these have reached England and have been recognized to be a derivative of the ordinary walnut (Juglans regia). They are provided with an inner very thin and an external stronger shell, but the latter is partly missing, and what remains is very readily scraped off. The nuts are cultivated in the mountains to the northeast of Peking. Zeitschr. Oest. Ap. Ver., No. 12, 1876, p. 192.

PIPERACEÆ.

Piper Nigrum.—Commercial Examination.—A. Wynter Blyth communicates some observations on the examination of commercial peppers, which are complementary to his former paper (see Proceedings, 1875, p. 221), and embrace the determination of hygroscopic moistures, the ash, the ash-constituents, the nitrates, the alcoholic and the aqueous extract.

The physical appearance of pepper, while sufficiently distinct to distinguish between varieties when several samples are together for comparison, do not enable the identification of a solitary sample unless the examiner has great practice. The merchant usually relies upon the weight, and by long practice is enabled to determine in a moment whether it is a light or heavy sample. Chevallier has determined the weight of what is technically called heavy, half-heavy, and light pepper, and found them separately to weigh 530, 512, and 470 grams to the litre. The author has determined one hundred pepper-corns of each of the following peppers: Penang = 6.2496 grams; Malabar = 6.0536 grams; Sumatra = 5.1476 grams; Trang = 4.5736 grams; Telicherry = 4.5076 grams. Ground peppers of commerce are always mixtures of different kinds of pepper, no such thing as pure ground Malabar or Penang pepper being found in the shops. According to Chevallier, the usual mixture is 33 per cent. of Malabar to give weight, 33 per cent. of Penang to give strength, and 33 per cent. of Sumatra to give color.

The hygroscopic moisture was determined in the usual way by drying about one gram of the finely powdered substance on a water-bath. No doubt a considerable quantity of water is retained by the pepper so treated, but owing to the volatile constituents it is very questionable whether it is advisable to dry at a higher heat than 100 C. (= 212° F.).

The ash was determined by burning two grams in a large platinum dish at a low red heat, until the residue was of an equal gray color and ceased to lose weight, and was then weighed as quickly as possible.

The determination of nitrates and nitrites was made, not because of any known service to the analyst, but because it is interesting and may become serviceable for future data.

The alcoholic extract, obtained by exhausting a weighed quantity of the dried substance by repeated quantities of boiling alcohol in a flask attached to an inverted condenser, is a fair index of the quality of a pepper, for the extract so obtained consists almost entirely of piperin and resin, the two constituents on which the qualities of pepper almost exclusively depend, and there seems to be no advantage of separating these constituents that sufficiently compensates for the time and trouble.

The aqueous extract, representing extractive coloring matter, soluble salts, gum, starch, and small quantities of piperin and resin, was obtained by thoroughly exhausting weighed quantities by a large quantity of boiling distilled water.

From the results as given by the author, the following tabulated statement has been compiled:

	PEPPER AS SOLD.			PEPPER DRIED AT 100° C. (— 212° F.)				
	Weight of 100 berries expressed in grams.	Loss in weight when dried at 100° C.(= 212° F.)	Total ash.	Soluble ash.	Total ash.	Nitrates and nitrites calculated as nitric acid.	Alcoholic extract.	Aqueous extract.
		Per ct.	Per ct.	Per ct.	Per ct.	Per ct.	Per ct.	Per ct.
Penang	6.2496	9.531	3.843	2.212	4.189	0.04470	7.650	18.335
Malabar	6.0536	10.548	4.674	3.453	5.195	0.03858	6.375	20 375
Sumatra	5.1476	10.103	3.334	2.626	4.316	0.06560	6.450	17.500
Trang	4.5736	11.664	4.211	2.538	4.775	0.11870	6.300	18.175
Tellcherry	4.5076	12.908	5.346	3.380	5.770	0.8860	7.896	16.500

The amount of starch in the five samples is nearly the same, Sumatra having the most, then Penang, and then Malabar, Telicherry, and Trang, which contain identical quantities. Some remarks on the adulterations to which ground pepper is subject, and the manipulations practiced upon whole pepper with fraudulent intent, are also embraced in the author's paper, to which is appended the following

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Matico.—Professor Maisch, in a paper read before the Association at its last meeting, stated that the term "Matico" is applied in South America to various plants, the leaves of which possess vulnerary properties. Proceedings, 1875.

AQUIFOLIACEÆ.

Ilex Cassine.—The leaves of this plant, sometimes called "American tea," and used by the aborigines in forming the decoction known as "yaupon," or "black drink," has been recently analyzed by H. M. Smith, and, notwithstanding that it was composed in very large proportion of twigs, it was found to contain a very large percentage of theina, besides a peculiar volatile oil having a tea-like odor. It was used by the Indians in the form of a very strong tea, and in large quantities, and not unfrequently acted as an emetic. The emetic effect may be due to the leaves containing also those of *I. vomitoria* (which, says the Ed. Dr. Circ., is however believed to be a synonymous term for I. Cassine). Mr. Smith failed to find an emetic principle in the plant. Dr. Circ., March, 1876, p. 59. Amer. Jour. Phar., 1872, p. 216.

EUPHORBIACEÆ.

Euphorbia Amygdaloides.—Analysis of Ash.—Dr. G. C. Wittstein has determined the ash of the flowering plant, grown on sandy soil in different localities. The yield of the air-dry substance was

5.936 per cent. in the one, and 4.850 per cent. in the other locality, and their respective compositions as follows:

	a.		b.	
Potassa, ...	33.441	per cent.	15.362	per cent.
Soda, ...	1.443	"	0.298	"
Sodium (combined with Cl),	1.155	"	0.540	"
Lime, ...	15.121	"	33.135	"
Magnesia, ...	4.370	"	4.796	"
Alumina, ...	1.057	"	1.325	"
Oxide of Iron, . . .	0.413	"	0.656	"
Protoxide of Manganese, .	0.344	"	trace.	
Chlorine, ...	1.781	"	0.833	"
Sulphuric Acid, . . .	7.135	"	3.733	"
Phosphoric Acid, . . .	5.414	"	4.474	"
Silicic Acid, ...	12.093	"	8.684	"
Carbonic Acid, . . .	15.832	"	25.970	"
Total, ...	99.599	"	99.806	"

Arch. Ph., April, 1876, p. 341.

Gutta-Percha.—Purification.—G. E. Willmarth recommends a method for the purification of gutta-percha, which is based upon the insolubility of the gutta-percha in alcohol, and the solubility of the solvent in that menstruum. The author tried both benzol and bisulphide of carbon, but gives preference to the latter by reason of the difficulty to obtain benzol of sufficient purity, and because the product with bisulphide of carbon possesses superior purity. 1 part of gutta-percha is dissolved in 16 parts of bisulphide of carbon by agitation; the solution is agitated with a small quantity of animal charcoal, and then filtered, taking care that there shall be no loss by evaporation. The filtrate is then poured into a wide-mouthed bottle containing four times as much alcohol by volume, the bottle is stoppered and well shaken until the gutta-percha collects into one mass and the supernatant liquid is clear. It may be necessary to add a litre more alcohol to effect complete precipitation. The gutta-percha is removed, pressed on a pill-tile with a spatula to as thin a sheet as is possible, and exposed for twenty-four hours to dry, or until a portion from the thickest part of the sheet dissolves clear in chloroform; or, it may be dried on a water-bath. The bisulphide of carbon is recovered by distilling the liquid from which the precipitate has separated at a very gentle heat, collecting it in an ice-cooled receiver, adding a large quantity of water, separating the bisulphide of carbon, and filtering. The alcohol remaining in the retort only requires filtering, and both solvent and precipitate are ready for use again. Thin sheets of gutta-percha may be prepared by pouring sufficient chloroformic solution of gutta percha into a beaker, rolling the beaker to form a uniform coating, and then immersing the vessel into cold water, when the film may readily be detached.

India-rubber.—Mr. Cross, who has been sent out to the Isthmus of Panama, on behalf of the India office, to collect seeds and young plants of the Caucho, or India-rubber tree, reports favorably on the advantage of making plantations of this tree (in India?). The caucho tree is of rapid growth. Each tree in a plantation would be worth in six years thirty dollars, whereas the cocoanut palm of the same age would not be valued, on an average, at more than one dollar. With regard to the two modes in use for extracting the caucho, by cutting down the tree, or by bleeding by incisions, Mr. Cross thinks there is little difference in the long run. By the latter method, if the incisions are cut deep enough to injure the *cambium*, and very likely to be done from carelessness, the tree is sure to die, and even if this is avoided, a too great or too often-repeated drainage of the tree of its sap, will extinguish its vitality. More information in a statistical form is, however, wanting to determine the best mode of extraction. Dr. Circ., March, 1876, p. 59; from J. Appl. Chem.

Elæococca Vernicia.—The seeds of the *oil tree* of China and Cochin-China yield, according to S. Cloëz, when submitted to strong pressure in the cold, about 35 per cent. of a liquid oil, which is colorless, inodorous, and almost insipid; has a sp. gr. (at 15° C. = 59° F.) of 0.9362, and thickens at —18° C. (= —0.4° F.) without losing its transparency or crystallizing. Ether extracts 41 per cent. of oil, which is slightly colored, but otherwise presents all the characters of the oil obtained by pressure. If instead of ether purified bisulphide of carbon is employed, the fatty matter remaining after the solvent has been evaporated off at 100° C. (= 212° F.), solidifies on cooling, forming a number of small reniform masses, which present under the lens decided crystalline texture. This solidified fat has the same elementary composition as the oil obtained by pressure, and melts at 34° C. (= 93.2° F.). The oil obtained by cold expression rapidly solidifies by light in the absence of air, which effect was found to be due to the more refrangible rays of the spectrum alone. It is one of the most drying of all oils, drying in a few hours when spread on a plate of glass or metal and exposed to the air. Ch. N., October 8th, 1875, p. 179; from Comp. Rend., September 13th, 1875.

URTICACEÆ.

Hops.—A new fermentic principle.—Sace states that there exists in the hop a ferment which is more powerful than that which exists in beer-yeast. It is soluble in water, and has the property—unique among ferments—of resisting the action of boiling water. Ch. News, Jan. 14th, 1876, p. 17; from Compt. Rend., Dec. 6th, 1875.

Goma de Sonora.—Shellac.—Crude shellac, as usually found in commerce, has been previously deprived of the matters associated with it that are soluble in water, by boiling in that liquid, whereby about 10 per cent. of a red dye, known as lac dye, is separated. Occasionally, however, small parcels not so treated are found in commerce. J. Herz has had opportunity to examine a specimen of a resinous substance, which had been received from Mexico, under the name of *Goma de Sonora*, and which seems to enjoy considerable reputation among the Mexicans in pectoral affections and various female diseases. The substance yielded 6 per cent. of its weight to water; about one-half of the undissolved portion proved to be identical with the purified shellac of commerce, and the remainder was nearly completely dissolved by boiling solution of potassa, some particles of wood, wings of insects, sand, etc., remaining undissolved. The aqueous solution contained, besides the red coloring matter, a considerable quantity of free acid, which the author has analyzed, and named sarkosinic acid (see Organic Acids, in this report). The alkaline solution of the residue, after treatment with water and alcohol, was of a handsome red color, and yielded a yellowish-white resin upon the addition of acids. This resin was partly soluble in ether. The so-called *Goma de Sonora* is, therefore, a variety of crude shellac. Arch. Ph., March, 1876, p. 234.

CONIFERÆ.

Pinus Maritima.—A. Petzoldt gives the following methods of turpentine collection from Pinus maritima in Northwestern France. The old method consists in making lengthwise incisions into the trunk of the trees, which end in a cavity, chopped into the broad base of the trunk, in which the turpentine collects. After the first incision ceases to yield, the new ones made are led, by means of diagonal incisions, into the old reservoir, the capacity of which is enlarged by means of moss and pieces of bark; the old reservoir being used because a certain portion of the resinous exudation is absorbed by new cavities. Hughes has, however, introduced a more economical method, which has now almost completely superseded the old crude method of turpentine collection, and by which both a larger yield and a purer product is obtained. This new method consists in replacing the crude reservoir of the old method by an earthenware reservoir, shaped like a flower-pot, and glazed on the inner surface. The capacity of these is nearly one litre, and they are provided near the rim with two opposite holes, by one of which it is suspended on a nail, at a suitable height, while the other allows the rain-water, collecting in the reservoir, to flow off. Lengthwise incisions are made as by the old method, and from these the turpentine flows into the reservoirs by small conduits, constructed of pieces of sheet zinc, about 3 c. m. wide and 15 c. m. long, bent so as to form a slightly concave channel. The author states that, notwithstanding the expense incurred in the acquisition of the earthenware vessels, etc., the increased yield during the first year is more than sufficient to cover this, and the annual breakage not over 5 per cent. In the *Pignadas* of M. Samados, 200,000 of these pots are in use. The collection of turpentine begins when the trees are 20 to 25 years old, and their trunks have a diameter of about 40 c. m. Zeitschr. Oest. Ap. Ver., No. 18, 1876, p. 280.

Turpentine Collection in the Bernese Jura.—Supplementary to a former paper upon the collection of turpentine in the Black Forest (see Proceedings, 1874, p. 163), Dr. Flückiger gives the result of some observations made by him on its collection in the Bernese Jura. Owing to a scarcity of trees, however, this industry is quite insignificant, only about 700 cwt. being the annual produce. The method of collecting the resin is exceedingly primitive, the implements and utensils being of the crudest kind. The trees are wounded, as near as possible to the ground, with a very large, rough, spoon-shaped implement, in lieu of the more practical hatchet peculiar to the Black Forest, and the incisions enter unnecessarily deep into the wood. The exuded turpentine is exceedingly impure, owing to the close proximity to the ground of the incisions made, and is therefore strained in order to render it marketable. It is therefore melted in water (usually in copper kettles over the open fire); the melted mass is poured into a coarse bag, and expressed in a wooden trough by means of a lever, both of the roughest construction. The production of turpentine in the Jura region is, owing to a yearly increasing scarcity of the trees yielding it (Pinus picea, Du Roi), destined to cease altogether at no very distant period. Schweiz. Wochenschr., No. 41, 1875, p. 371.

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b. Animal Drugs.

PORIFERA.

Bleaching of Sponges.—The following method is recommended in Zeitschr. Œst. Apoth. Ver.: The calcareous matter having been removed by hydrochloric acid, the sponges are washed in water and then immersed in a solution of 1 part of permanganate of sodium or potassium in 45 parts of water for five to ten minutes. The sponges have now acquired a deep brown color, and are steeped for one or two minutes in a solution of 1 part of oxalic acid to 50 parts of water, containing a little sulphuric acid. The acid solution dissolves the peroxide of manganese deposited on the sponges and leaves them perfectly white. After this they are washed. The process is preferable to all others, since no unpleasant or hurtful vapors are evolved, as is the case by the more usual methods, and the quality of the sponge is not in the least affected. Ph. Centr. H., No. 39, 1875, p. 333.

ANNULOSA.

Leeches.—According to an authority in the "Medical and Surgical Reporter," leech-hunting is carried on to a considerable extent on the lower Delaware. Pennsylvania leeches are considered the best native sort, and the hunters supply the Middle States as well as their own. They have several methods of catching them, such as driving horses and cattle through shallow runs, when the leeches take hold of their fetlocks. Another ready means of taking them is by laying a bait of liver in the water, of which the leech is very fond; but the surest and quickest way is to stir them up out of the mud and scoop them out with a small net on the end of a pole. As they are only caught in the spring and during the early part of summer, it is necessary to lay in a winter supply, which is placed in a covered glass jar, to admit light, and the water changed three times a day. Can. Ph. Jour., February, 1876, p. 252.

INSECTA.

The Honey-bee and its Products, is the subject of a paper by B. T. Creighton, in which the habits of bees, the methods of raising them, etc., are particularly considered. From fifteen to twenty pounds of honey is considered the yield of a good hive during a favorable season; the hive being robbed soon after swarming. The present mode of robbing a hive differs from the olden way, the construction of the hive allowing the new honey to be taken every year, whilst by the old method, in which four or five square boxes were placed one upon another, the top box was removed and an empty one placed at the bottom of the others. The honey and wax were, therefore, generally four or five years old. The dark color which characterizes much of the yellow wax is due to different causes, among which the most influential are the flowers from which it is collected and the age of the comb. The statement sometimes made by old wax dealers, that "old bees make dark wax and young bees clear wax," is not substantiated by the author's experience. A. J. Ph., November, 1875, p. 487.

Wax.—Detection of resin. Recently several apothecaries of Berlin were cheated with wax containing 20 per cent. of resin. The sp. gr. of pure wax being between 0.960 and 0.963, it will float in the officinal ammonia water (sp. gr. 0.960), while a sample adulterated with resin will sink in the same liquid, the resin having a higher specific gravity. A. J. Ph., February, 1876, p. 65; from Phar. Zeitung, 1875, No. 102.

MAMMALIA.

Conservation of Meat.—V. Herzen has found the following solution to be an excellent conservative for meats: 8 parts borax, 2 parts boric acid, 3 parts nitre, 1 part common salt, in sufficient water to make 100 parts. The meat is immersed in this fluid for twenty-four to thirty-six hours, is then removed, packed in tin cans, and a little of the solution added. Before using the meat it is immersed in water for twenty-four hours. Meat has been transported in this way from La Plata without undergoing the slightest change.

The conservation of meat by means of compressed air—first proposed by Best—has been the subject of further and very satisfactory experiments by Alvaro Reynoso, who, with such agents as compressed air, oxygen, nitrogen, and hydrogen, was enabled to preserve raw meat, in pieces of 63 kilograms, for from one to three months, in such perfect condition that the blood still retained its fluidity. It is also contended that the meat so preserved will subsequently keep longer when exposed to air than is the case under ordinary conditions. Zeitschr. Œst. Ap. Ver., No. 34, 1875, p. 555.

INORGANIC CHEMISTRY.

HYDROGEN.

Peroxide of Hydrogen.—E. Schöne's experiments upon the delicacy of the various reagents for peroxide of hydrogen, have led him to the following results:

(1.) *Iodide of potassium*, *starch-water*, and *sulphate of iron* (Schönbein), is capable of detecting $\frac{1}{20000000}$th part with certainty, and, with some practice, even $\frac{1}{25000000}$th.

(2.) *Solution of guaiacum resin* and *infusion of malt* (Schönbein), is somewhat less sensitive than 1; the extreme limit being $\frac{1}{20000000}$th.

(3.) *Ferricyanide of potassium* and *perchloride of iron* (Schönbein), and

(4.) *Alkaline solution of oxide of lead*, *solution of subacetate of lead*, *iodide of potassium*, *starch*, and *acetic acid* (Struve), are the most sensitive reagents, but their reactions taken separately are not characteristic for peroxide of hydrogen; as other substances, occurring in meteoric waters, produce identical reactions with them.

The presence of peroxide of hydrogen may be determined, within the above-named limits, with certainty by either 1 or 2; while 3 and 4 must be taken together, and are applicable when extremely minute quantities are present in a liquid. While 1, 2, and 3 require but a few minutes for the completion of the reaction, 4 requires several hours, and is consequently less convenient.

For the quantitative determination of peroxide of hydrogen the methods heretofore proposed are not sufficiently sensitive. The author proposes a colorimetric test, which depends upon the formation of iodide of starch when solutions of iodide of potassium and starch are added to the liquid containing peroxide of hydrogen. He compares the intensity of the blue color produced in a given volume of the liquid tested, with a series of liquids of like volume in which definite quantities of peroxide of hydrogen have been acted upon by iodide of potassium and starch-water, and which are contained in clear, glass-stoppered vials of like shape and size as that in which the tested liquid is contained. Ten such vials, representing respectively 0.1, 0.2, 0.3, 0.4, 0.5, 0.6, 0.7, 0.8, 0.9, and 1.0 milligram of peroxide of hydrogen to the litre, constitute his colorimetric scale, by which he is enabled to determine $\frac{1}{10}$th milligram of HO_2 in a litre accurately, and $\frac{1}{100}$th milligram approximately. To insure accuracy the colorimetric scale is prepared fresh every two weeks. Ph. Centralhalle, No. 45, 1875, p. 380.

NITROGEN.

Nitrogen.—Preparation.—Nitrogen in quantity is generally prepared by leading air over copper-turnings ignited in a glass tube; oxide of copper is formed, and nitrogen passes over alone. A considerable length of copper must be heated, and the reaction comes to an end when the copper is somewhat thickly coated with oxide. It was suggested by V. Harcourt that if the air was mixed with ammonia by bubbling through a strong aqueous solution, the oxide of copper would be reduced as fast as formed, and the reaction would continue as long as the solution contained any ammonia. Air and ammonia would give nothing but water and nitrogen—

$$3(2N_2 + O) + 2NH_3 = 3H_2O + 7N_2 (O = 16).$$

S. Lupton has tried this experiment and found that about three inches of copper-turnings, heated by an ordinary Bunsen burner, served to replace the long furnace and combustion-tube of the ordinary method, and that the slightest excess of air shows itself by tarnishing the surface of the turnings. He has several times prepared, by this method, nitrogen so pure that a stream of it did not alter the surface of fused potassium. Ch. N., March 3d, 1876, p. 90.

Iodide of Nitrogen.—Champion and H. Pellet find that iodide of nitrogen, prepared by shaking 1 gram of iodine with 10 c.c. of ammonia for ten minutes, and washing with 10 c.c. of ammonia, and then with water, always behaves in the same manner. Chlorine and bromine cause this substance to explode; it also explodes when heated gradually to 48° C. (= 118.4° F.). J. Chem. Soc., April, 1876, p. 518; from Bull. Soc. Chim.

Peroxide of Nitrogen.—E. Luck has obtained a new compound by the union of peroxide of nitrogen with phosphate of magnesium. It has the composition $= P_2O_8Mg_2H_2 + NO_2 (O = 16)$, is almost insoluble in water, but communicates acidity to it, and dissolves in acids with evolution of red fumes. Ch. N., July 2d, 1875, p. 9; from Bul. Soc. Chim., Paris, No. 10, 1875.

Nitric Acid.—Action upon Copper, Mercury, etc.—The action of nitric acid upon metals is known to give rise to the evolution of lower oxides of nitrogen, or nitrogen itself, and finally to the formation of ammonia, as the case may be. The products of the decomposition are usually stated in chemical text-books to be of a well-defined nature, and are expressed by definite equations. Several instances are known, however, from which the contrary must be inferred. I. I. Acworth has studied the action of nitric acid on copper, zinc, mercury, and silver, and the influence which the presence of metallic nitrate exerts, and by the experiments detailed arrives at the following conclusions:

1. The action of cold and dilute nitric acid upon copper gives rise chiefly to the evolution of nitric oxide 90–95 per cent. Rise of temperature or increased strength of acid produces a more vigorous reaction. As the solution becomes saturated with nitrate of copper the volume of nitrous oxide increases.

2. Nitric acid acting upon copper, in presence of a strong or nearly saturated solution of nitrate of copper, gives to the formation of all but pure nitrous acid as much as 85 per cent.

3. The presence of nitrate of potassium has little or no influence upon the evolution of the nitric oxide from copper and nitric acid.

4. The presence of nitrate of ammonium gives rise to the evolution chiefly of nitrogen and nitrous oxide, together with varying amounts of nitric oxide.

5. The action of nitric acid upon zinc, in presence of nitrate of ammonium, gives rise chiefly to the formation of nitrogen gas.

6. Iron gives similar results.

7. Mercury, nitric acid, and nitrate of ammonium gives nearly pure nitrogen. The action is, however, very sluggish.

8. Nitric acid upon silver, chiefly nitric oxide and nitrogen. Nitrous oxide is all but absent.

9. Silver and nitrate of ammonium gives rise to the formation of nitric oxide, but chiefly nitrogen (82–64 per cent.). J. Chem. Soc., September, 1875, pp. 828–844.

Detection in Potable Waters.—Aug. Vogel proposes the following: About ten to fifteen cubic centimetres of the water to be examined are placed in a small porcelain capsule, a few cubic centimetres of chemically pure hydrochloric acid and a little pure gold leaf are added, and the mixture is then boiled, when, if nitric acid or nitrates are present, a portion of the gold leaf is dissolved, and the liquid acquires a yellowish tinge. The solution is now filtered and protochloride of tin added, when, according to the quantity of nitrates present, a more or less distinct red color is produced, owing to the formation of purple of Cassius. In the presence of minute quantities of nitrate no effect may be observed at first, but on standing several days a faint light-red deposit will form. If the latter is pure white the presence of nitrate is precluded. Ph. Centr. Halle, No. 19, 1876, p. 162.

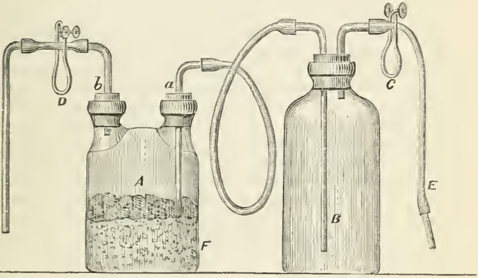
Nitric Acid from Ammonia.— H. Schwarz communicates a method for the continuous formation of nitric acid from ammonia, which, being readily executed, is very suitable for lecture experiments. When peroxide of manganese is evaporated with hydrate of soda and some lime to dryness, and the mixture is then heated gently in air, manganate of sodium is formed. When this powdery mixture is introduced into a glass tube, and is then heated in a current of pure ammonia, the latter is oxidized and nitric acid is formed; but the formation ceases after a time, in proportion to the reduction of the manganic acid to peroxide. To avoid this, and to make the process continuous, the ammonia is admitted in admixture with air, when the formation of nitric acid will take place uninterruptedly and for as long a period as may be desired. Ch. C. Bl., No. 46, 1875.

SULPHUR.

Sulphuretted Hydrogen.—A New Generator.—B. Casamajor has constructed a new apparatus for generating sulphuretted hydrogen, which is represented by the accompanying woodcut (Fig. 30). The bottle marked *A* is provided with two tubulures, through one of which passes a glass tube, ending at its lower part in an enlarged portion, *F*, which must, however, be narrow enough to pass through one of the tubulures. This tube passes through a rubber cork capable of closing the tubulure *a* perfectly, and before introducing it into the tubulures the enlarged portion is filled with some coarse fibrous material, such as coarse tow. A quantity of No. 3 shot is introduced into the bottle to a level height of about two or three inches, and this is covered with pieces of sulphuret of iron. The tubulure *b* is now closed with a rubber cork, provided with a tube to lead the generated gas into a wash-bottle, and this tube is provided with a screw pinchcock *D*. The wide-mouthed bottle, *B*, is the reservoir for dilute sulphuric acid when the apparatus is at rest.

It is closed by a rubber cork provided with two tubes, one of which extends down to the bottom of B, and communicates by means of a flexible rubber tube with the glass tube in the tubulure a of bottle A. The other glass tube of the bottle B terminates in a flexible rubber tube, E, which may be tightly closed by means of the pinchcock C. The bottle B is filled to about two-thirds of its height

FIG. 30.



with dilute sulphuric acid, which is caused to flow into the bottle A by blowing air through the tube E, and at the same time keeping the pinchcock D open, when it is desirable to generate sulphuretted hydrogen. Upon closing the pinchcock D, sufficient gas accumulates in a minute or two to drive the dilute acid back into the bottle B if the pinchcock C is then opened. At the same time a certain quantity of gas also passes into B, the connection between the two bottles is interrupted, and remains so while the apparatus is not in use. Ch. N., February 18th. 1876, p. 67.

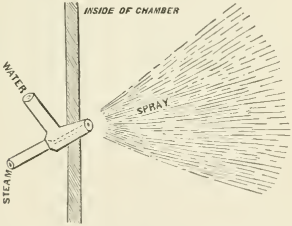
Oxidation of Sulphur.—The researches of E. Polacci lead him to the following conclusions: When sulphur is exposed in a moist condition, and under ordinary conditions of temperature, it is easily converted into sulphuric acid, even when not associated with any other material. This conversion, slowest at a low temperature, is accelerated at 35° to 50° C. (= 95° to 122° F.), and becomes rapid at 65° to 70° C. (= 149° to 158° F.). The addition of carbonate of calcium, but not that of any other earthy carbonate, to the sulphur facilitates the production of sulphuric acid. Even dry sulphur, by the mere contact with moist air, gives rise to sulphuric acid. In this case the amount of sulphuric acid formed will be in proportion to the absorbent power of the sulphur. Hydrosulphuric acid is also slowly converted into sulphuric acid, if it is mixed with moist air in presence of a porous body, at a moderately elevated temperature. Ch. N., August 6th, 1875, p. 62; from Gaz. Chim. Italiana, No. 5, 1875.

Sesquioxide of Sulphur.—As early as 1804, Buchholz had observed an intensely blue body during the distillation of a mixture of sulphur and fuming sulphuric acid. This body has been noticed by a number of chemists since then, but its characters have not been developed. R. Weber has now subjected this body to examination, and having succeeded to isolate it in sufficient quantities to justify an analysis, finds it to correspond in its composition to the empirical formula S_2O_3. Owing to its indifferent characters he has named it "sesquioxide of sulphur." It is very prone to decomposition, separating sulphur when exposed to moist air, and more readily when brought in contact with water, sulphurous acid being formed. When selenium is dissolved in sulphuric acid a handsome green body is formed, which the author finds to correspond to the empirical formula $SeSO_3$. This compound is consequently the analogue of sesquioxide of sulphur, in which one atom of sulphur is substituted by one atom of selenium. Ph. Centralhalle, No. 17, 1876, p. 140.

Sulphuric Acid.—A. Girard and H. Morin communicate some interesting statistics upon the quality, source, and consumption of pyrites in France. The consumption of pyrites in France has risen during the last decade from an annual amount of 90,000 tons to 180,000 tons. During the same period it has risen in England from 180,000 to 520,000 tons. The pyrites of the Rhone, or of Saint Bel, contain on an average 46 to 48 per cent. of sulphur, with 10 to 12 per cent. of a gangue of clay, sand, and heavy spar. In the southern portion of the Saint Bel district the sulphur ranges from 50 to 53 per cent. The gangue is slight, and free from baryta. Arsenic is found only in proportions too small to be determined. In the Saint Julien district (le Gard) the pyrites are found not in argillaceous schists, as at Saint Bel, but in the lias and trias. The sulphur varies from 40 to 45 per cent. The gangue is calcareous, and ranges from 3 to 6 per cent. Arsenic is found to the extent of 0.1 per cent., and the amount of fluoride of calcium is sometimes determinable. The pyrites of the Adèche contain 45 to 50 per cent. of sulphur; the gangue is argillaceous, free from lime. In some samples the arsenic reaches 0.3 per cent. The total amount of pyrites in France is equal to a century's consumption. Ch. News, Aug. 20th, 1875, p. 84; from Compt. Rend., July 26th, 1875.

H. Sprengel's application of atomized liquids in operations where a liquid is made to act as an absorbent of a gas, has been applied by him to the manufacture of sulphuric acid; *pulverized or atomized water or spray* being injected into the chambers as a substitute for steam. This effects a saving (1) of fuel equal to the amount which is required to convert the *pulverized* water into steam, and (2) a cooling of the chambers equal to the loss of the amount of heat which would have been generated by the combustion of the coal thus saved. The spray is produced at present by means of some steam, which is made to escape from a platinum-jet under a pressure of about two atmospheres into the centre of a flow of water, as shown in Fig. 31. Twenty pounds of steam will then convert 80 pounds of water into a cloud like mist, the actual weight of which, issuing from a jet of the above (?) size, amounts to about $\frac{1}{3}$ ton in twenty-four hours. These jets are placed in the side of the chambers, about 40 feet apart. They are supplied with water from a tank above, while the steam is taken from the steam-pipes already existing between the chambers, or better from smaller ones put in their place. At the Lawes Chemical Manure Company's works the saving in coal amounts to about one-third of

FIG. 31.



the quantity formerly burned; the construction of the apparatus costing (at the works named) about £10 per chamber. The saving per ton of acid of sp. gr. 1.6—made from pyrites—amounts to about 5s. Besides the saving in fuel, there has been a saving of 6½ per cent. of pyrites and 14¾ per cent. of nitre. Ch. N., Sept. 24th, 1875, p. 150.

New Distilling Apparatus.—MM. Favre and Kessler have designed a new apparatus for distilling sulphuric acid, which is composed of a wide, shallow platinum cistern, covered with a cap of lead with double walls, between which circulates water, so as to keep the cap at a moderate temperature. The edges of the cistern are connected with the leaden cap by a hydraulic joint, and the two metals do not come in contact. On the one hand the cistern receives through a leaden tube acid at 60° from a preparatory concentrator; and on the other, it delivers acid at full strength through a pipe of platinum. Thirty-nine of these arrangements are already in operation in twenty-six sulphuric acid works. Ch. N., Feb. 4th, 1876, p. 55; from Les Mondes, Jan. 13th, 1876.

Solution of Platinum in the Acid.—Scheurer-Kestner concludes from his experiments that the loss of weight in the platinum stills is not due to a simple mechanical action of the boiling acid. When the acid is free from nitrous compounds it dissolves about 1 gram of platinum for 1000 kilos of acid concentrated to 94–100. If the concentration is carried to 98–100, 6 to 7 grams are dissolved, and 9 if the acid is prepared at 99.5 per cent. If nitrous compounds are present the amount of metal dissolved is in much larger proportion. Platinum alloyed with iridium is much less attacked, an advantage, however, which is, to a great extent, compensated by the brittleness of the alloy. Ch. News, Dec. 10th, 1875, p. 281; from Compt. Rend., Nov. 15th, 1875.

Thorn proposes hyposulphite of sodium for removing the arsenic from chamber acid. Such acid, of 50° B., is heated in a leaden vessel to 70–80° C. (= 158–176° F.), and the necessary quantity of hyposulphite, either in solution or powder, is added. The sulphite of arsenic formed separates in yellow flakes, rises to the surface, and is separated by decantation. Acid so purified contains from 0.3–0.4 per cent. of sulphate of sodium. Ph. Centr. H., No. 42, 1875, pp. 354 to 355.

Referring to Thorn's method, and while according all credit to the process, R. Wagner states that the similar method of H. A. Smith (in his "The Chemistry of Sulphuric Acid"), in which sulphide of sodium is used, is to be preferred. When the small percentage of sulphate of sodium, which is introduced by either method, is an objection, however, and Bode's method with sulphhydric acid is not desirable, the method of Dupasquier dependent upon the direct addition of sulphide of barium to chamber acid of 50° B., is to be preferred to all other methods of purification. Hyposulphurous acid, nevertheless, is a valuable agent, but in most instances its employment as a barium compound—obtained by double decomposition between chloride of barium and hyposulphite of sodium—is preferable to the sodium salt. Ch. C. Bl., No. 46, 1875, p. 722.

Maumené has observed a variation in the temperature produced when sulphuric acid of sp. gr. 1.845 is mixed with olive oil, when the acid had been recently *boiled*, and after it had been kept some time, all other conditions being precisely the same. Thus an acid which had been kept for over two months, and had a sp. gr. of 1.845, when mixed with olive oil (10 c.c. acid to 50 c.c. oil), gave a rise of temperature of 34.5° C. (= 94.1° F.), while recently boiled acid gave a rise of 44° C. (= 111.2° F.). Water seems to give rise to differences of the same kind, a variation of 33° C. (= 91.4° F.) and 36° C. (= 96.8° F.) having been observed. The author infers, therefore, that a temperature of 326° C. (= 708.8° F.) gives sulphuric acid a structure different from that which it possesses when it has remained for two or three weeks at ordinary temperatures. Ch. N., Oct. 29th, 1875, p. 217; from Compt. Rend., Oct. 4th, 1875.

CHLORINE.

Chlorine.—The following method for preparing chlorine, though somewhat more expensive than that usually employed, has the advantage of great cleanliness and ease of management: An excess of hydrochloric acid is added to a solution of bichromate of potassium saturated with sulphuric acid. Chlorine gas is liberated at ordinary temperatures, but by ebullition the formation of the gas is accelerated, and may be considered complete when the liquor takes a green color. In this way the chlorine in the whole of the hydrochloric acid is obtained, quietly and regularly, without effervescence, and with ordinary apparatus. The Laboratory, October, 1875, p. 20.

Volumetric Determination.—G. Boug recommends ferrocyanide of potassium as preferable to arsenious acid for the volumetric determination of chlorine. For this purpose a normal solution is prepared by dissolving 37.765 grams of the salt in sufficient water to make 1 litre; a quantity which corresponds to 1 litre of chlorine. 10 c.c. of this solution are diluted with water, acidulated with muriatic acid, and colored with a few drops of solution of indigo; the solution containing chlorine is then added until the blue color has disappeared, and is changed into the brown color of ferridcyanide of potassium. The results are correct and decisive; dilution or strong acidity do not influence it in the least, and it is more readily executed than with arsenious acid. Ph. Centr. Hall, No. 10, 1876, p. 83; from Chem. Centralbl.

Hydrate of Chlorine.—($Cl_2 + 10H_2O$ ($O = 16$)). Goepner had recently investigated this compound, and cites U. Schiff as the author of the view which regards it as $ClHO + HCl + 9H_2O$ ($O = 16$). Schiff does not remember of having ever published such a view, which is of much more ancient date. He points out that hypochlorous acid is an explosive compound, whilst the hydrate in question shows no tendency of the kind, even when thrown into concentrated sulphuric acid somewhat heated. The hydrate occupies an entirely special position in the chemical system. Ch. N., August 6th, 1875, p. 62; from Gaz. Chim. Italiana, No. 4, 1875.

Hydrochloric Acid.—A new crystalline hydrate.—J. Pierre and E. Puchot find that if commercial concentrated hydrochloric acid be subjected to a very low temperature no portion of it separates in the crystalline form, even though a temperature between —25° and —30° C. (= —13° and —22° F.) is maintained during a considerable time. But if a continuous current of nearly dry hydrochloric acid gas be passed into it a different effect is produced. When the temperature has descended to —21° or —22° C. (= 69.8° or 71.6° F.), and has remained stationary a few moments after supersaturation, it rises spontaneously to —18° C. (= —0.4° F.), although the freezing mixture is kept below —22° C. (= —76° F.). From this point an abundant crystallization is formed, supported by the current of gas, and the temperature remains, without sensible variation, at —18° C. (= —0.4° F.). These crystals of hydrated hydrochloric are not very stable, a circumstance which renders their direct analysis very difficult; observations lead the authors to adopt the formula $HCl,2H_2O$ ($O = 16$). The crystals give off thick white fumes in decomposing, and are very rapidly dissolved by water. Their crystalline form has not been determined, but it appears to approach that of carbonate of sodium. Ph. J. Trans., March 18th, 1876, p. 745; from Compt. Rend., p. 48, vol. lxxxii.

A commercial sample of hydrochloric acid, examined by E. Scheffer, proved to contain a very large percentage of chloride of lead. In this connection the author made the interesting observation that the precipitate, formed upon diluting a saturated solution of sulphate of lead in muriatic acid with water, is not sulphate of lead, as might be expected, but chloride of lead; sulphate of lead is, therefore, not dissolved as such in hydrochloric acid, but is converted into chloride of lead. A. J. Ph., November, 1875, p. 485.

Chlorinated Lime.—O. Opl arrives at the following practical conclusions in regard to the nature and the spontaneous decomposition of chlorinated lime: For the production of a good chlorinated lime the temperature of the chambers must be as low as possible; the product obtained at 15° R. (= 65.75° F.) being a firm mass, which may be crushed into a fine, dry powder, whilst that obtained at 25° R. (= 88.25° F.) is soft and damp, and gives off a strong odor of chlorine. Hence winter is always found the most favorable season for its manufacture. The temperature of the chambers should never exceed 20° R. (= 77° F.); the chlorine should enter the chamber as cold as possible, and should be free from hydrochloric and carbonic acids; the hydrate of lime should be very pure, and should contain only as much water as can be added without inconvenience to sifting. After removing the chlorinated lime from the chambers, which should have a shape which admits of easy cleaning, it should be left in chests with covers, and should be often turned over, so that its temperature may fall at least to 17° R. (= 70.25° F.) before it is packed in casks. Ch. News, July 9th, 1875, p. 19; from Monit. Scient., June, 1875.

Mr. Charles T. Kingzett communicates some additional experiments upon hypochlorite of calcium (see Proceedings, 1875, p. 243), which he has obtained both by the aid of freezing mixtures from saturated solutions of chlorinated lime, and by evaporating such solutions in vacuo. The analysis of these products seems to prove them to be hypochlorite of calcium, but the author considers it desirable that the experiments should be repeated on many samples of chlorinated lime. Ch. N., July 16th, 1875, p. 22.

Ferdinand Kopfer considers it simplest to regard hypochlorous acid as a direct product of the decomposition of chlorinated lime by mineral acids. Either Gay-Lussac's or Odling's hypothesis on the constitution of the bleaching constituent of the chlorinated lime must be accepted, but the author has not been able to determine to which of these the preference belongs. Ch. N., August 6th, 1875, p. 62; from Liebig's Am. Ch., June, 1875.

BROMINE.

Bromine.—The great facility with which mercuric sulphide is decomposed and dissolved by an aqueous solution of bromine has led Rudolf Wagner to study the action of an aqueous concentrated solution of bromine, or of a solution of bromine in concentrated hydrochloric acid, upon the quicksilver ores of Idria and the Palatinate. By digesting the powdered cinnabar for several days with an excess of bromine solution, the sulphide was almost completely extracted. Any metallic mercury that may be present in the ores also becomes dissolved by a hydrochloric acid solution of bromine, and on passing sulphuretted hydrogen through the solution the mercury is all precipitated as black sulphide. The employment of bromine as a means for the extraction of gold from pyrites cinders is also referred to. The process for treating crude platina in the wet way may be considerably shortened by substituting for aqua regia a mixture of nitric acid with bromine or hydrobromic acid. Bromine appears particularly adapted for use instead of chlorine, in the preparation of ferricyanide from ferrocyanide of potassium; for the conversion of manganate into permanganate of potassium, and for the oxidation of arsenious into arsenic acid. Jour. Ch. Soc., May, 1876, p. 741; from Dingl. Polyt. J., ccxviii.

According to G. Kilpius, bromine-water can be used very conveniently instead of chlorine for the separation of nickel, as black peroxide, from cobalt. Water takes up about four times as much bromine as chlorine, and although (since the combining number of bromine is rather twice that of chlorine) the activity of bromine-water is less than that of chlorine-water, yet, bulk for bulk, the advantage lies considerably on the side of the former, whilst its preparation is very much more easy. Ibid., p. 742; from Arch. Pharm.

Hydrobromic Acid.—A. Bertrand has found that gaseous hydrobromic acid may be most readily obtained, without decomposition of the acid, if 100 grams of bromide of calcium, 50 grams of water, and 100 grams of sulphuric acid are allowed to react upon each other. As is well known, the acid cannot be obtained from an alkaline bromide by the action of sulphuric acid, as the hydrobromic acid reduces the sulphuric acid to sulphurous acid with liberation of bromine. It may, however, be prepared from an alkaline bromide by substituting tribasic phosphoric acid for sulphuric acid; the reaction occurring regularly, when 100 parts bromide of potassium, 100 parts phosphoric acid, and 300 parts of water are used. While hydrobromic acid is decomposed by very concentrated phosphoric acid, diluted phosphoric acid causes but very slight decomposition during the first stages of the reaction. Ch. Centr. Bl., No. 11, 1876, p. 163; from Compt. Rend., 82, p. 96.

Professor Markoe read a paper on the preparation of hydrobromic acid from phosphorus and bromine, the hydrobromic acid formed in the presence of water being separated from the resulting phosphoric acid by distillation. Proceedings, 1875.

Charles Bullock communicated ready methods for preparing various bromides and hydrobromates. Ibid.

IODINE.

Iodine.—According to Sergius Kern, sulphocyanide of palladium (which see) does not afford a black precipitate in alcoholic solutions of iodine. Chloride of palladium, which produces a black precipitate in solutions of iodine, is a very delicate reagent, but the author's observation determines that it is such only in the absence of sulphocyanides. Ch. N., November 19th, 1875, p. 242.

Pentachloride of Iodine.—The existence of this compound has been held in controversy and is generally doubted. O. Brenken has recently made experiments which seem to prove its non-existence, he having failed to obtain it by any of the methods hitherto proposed. The author proves also that the decoloration of iodide of starch is not due to the formation of pentachloride of iodine, but that iodic acid is formed, according to the following equation: $I + 5Cl + 5HO = IO_5 + 5HCl$. Zeitschr. Œst. Ap. Ver., No. 26, 1875, p. 425.

Iodide of Potassium.—G. Pellagri recommends the conversion of iodate into iodide of potassium by agitating the warm solution of mixed iodide and iodate of potassium with iron filings. The iron is under these circumstances directly oxidized at the expense of the iodic acid. None of the iron enters into solution; but if the solution is too concentrated, the oxide of iron formed may in its turn oxidize the iodide of potassium, in which event it becomes necessary to filter and add fresh quantities of iron filings. Powdered zinc will serve the same purpose as the iron. The reduction is incomplete at ordinary temperatures. Schweiz. Wochenschr., No. 50, 1875, p. 423; from Ber. Chem. Ges., 1875, No. 16.

Some years ago Van Melckebeke communicated a method for the detection of bromide of potassium in iodide of potassium, which is based upon the solubility, to a certain extent, of iodide of potassium in a solution of bromide of potassium, saturated at the temperature at which the experiment is to be made. This method has been unfavorably criticized, and E. Biltz has endeavored, at the request of the editor of Arch. f. Pharm., to decide the value or defects of the method, which is as follows:

10 c.c. of an aqueous solution of bromide of potassium saturated at 16° C. (= 60.8° F.), are diluted with 10 drops of distilled water, and about one gram of the suspected iodide is then added in small portions, the liquid being well shaken after each addition. If the iodide of potassium is free from bromide, it is dissolved almost instantaneously, while, when it is contaminated with bromide of potassium, this will remain undissolved. By his very careful experiments, Biltz arrives at the conclusion that the method is accurate within the limit claimed (3 per cent. of bromide), if instead of adding the water to the saturated solution by drops, it is added by measure, 10 c.c. of the solution requiring not 10 drops but 0.7 c.c. of water. Arch. Ph., Aug. 1876, p. 144.

Some samples of iodide of potassium have been submitted to T. F. Bert for analysis, who found them to contain, respectively, 5.44, 5.35, 2.32, 1.78, 0.53 per cent. of excess of alkali, chiefly in form of carbonate. Though the last figure may be considered a comparatively small excess, the author considers it still too high, 0.15 to 0.20 per cent. being admissible. Among other annoyances caused by an excess of alkali in the iodide, that of precipitating ingredients of prescription which ought otherwise to be kept in solution, and thus again altering the nature of the prescribed mixture, materially affects the interest of the pharmacist. Ph. J. Trans., March 11th, 1876, p. 721.

Iodates.—New Reaction.—Come has observed that if some drops of water in which phosphorus has been standing be added to a solution of an iodate with starch paste, an intense blue color is produced. The reaction, which is due to phosphorous acid, is not affected by the presence of acids, bases, or salts. Phosphorated water is without action in chlorates or bromates, but is available for the detection of iodides, if these are previously treated with hypochlorite of sodium and boiled, a drop of a 10 per cent. solution of iodide of potassium in a litre of water giving under these circumstances a marked coloration. Ch. and Drug., Feb. 15th, 1876, p. 41; from J. de Ph. et de Ch., Dec. 1875.

FLUORINE.

Hydrofluosilicic Acid.—Stolba recommends that the silicic fluoride be absorbed in hot instead of cold water; hot water (at 60° to 70° C.) (=140° to 158° F.) absorbing the gas more readily, while the silica separates better, and all danger from the stopping up of the delivery tube is avoided. The sulphuric acid employed should be carefully freed from arsenic; the product is contaminated with arsenic fluoride. The preservation of the finished acid is best effected by the addition of one-half its volume of alcohol, allowing the mixture to stand 24 hours, and then filtering. A certain amount of silica is thus separated, and the acid will not deposit any thereafter, as is the case with the aqueous solution. An acid so treated may be kept in glass vessels for an indefinite period without affecting the glass in the least, and it possesses the further advantage of being applicable for the determination of the alkalies, the fluosilicates of which are insoluble in alcoholic mixture. Chr. Centr. Bl., No. 27, 1875, p. 419.

Fluosilicate of Ammonium.—Stolba recommends the following method of preparing this compound from crude hydrofluosilicic acid: Fluosilicate of iron is formed by digesting iron wire with the acid at a moderate temperature, this process being best conducted in the open air, or under a hood attached to a good flue, in order to avoid the unpleasant vapors (usually containing arsenic) evolved. The saturation of the acid being completed, the solution of fluosilicate of iron is filtered and evaporated carefully until, upon cooling, crystals begin to deposit. The hot liquid is then filtered, and a boiling saturated solution of one-fifth the weight of muriate of ammonium is added. The mixture is then allowed to cool (in summer with the aid of ice or a freezing mixture), and occasionally stirred. The crystals are placed upon a suction filter, washed with small quantities of water upon the filter, and recrystallized from their hot saturated solution. These, when again washed and dried upon a suction filter, are then in a condition of great purity. The mother liquors will yield an additional quantity of the salt. Ph. Centralhalle, No. 31, p. 258.

PHOSPHORUS.

Allotropic (Red) Phosphorus.—A series of clinical investigations upon the powers of allotropic phosphorus, made by J. Ashburton Thompson, seem to prove this modified variety of phosphorus to be completely inert. The apparent active properties hitherto observed in this form of phosphorus may be owing to its contamination with unchanged phosphorus, as has already been suggested by Méhu. The amorphous phosphorus used in the author's investigations was furnished him by Mr. Postans (see Proceedings, 1875, p. 252), and was doubtless free from unchanged phosphorus. Ph. J. Trans., July 17th, 1875, p. 41.

Commercial Red Phosphorus.—R. Fresenius and E. Luck have found commercial red phosphorus to have the following composition: Red phosphorus, 92.630; yellow phosphorus, 0.560; phosphorous acid, 1.308; phosphoric acid, 0.880; water and other impurities, 4.622. The determination was made by extracting the acids with water; the phosphorous acid determined by treatment with mercuric chloride in excess and weighing the mercurous chloride formed, and the yellow phosphorus was separated from the red by dissolving it in bisulphide of carbon, in which the red phosphorus is insoluble. Ph. Centr. Halle, June 29th, 1876, p. 227.

Phosphoretted Hydrogen.—According to Professor Hofmann, this gas can only be prepared perfectly pure from iodphosphonium, all other methods hitherto in use producing a product contaminated with more or less free hydrogen. Iodphosphonium, which is a crystallized compound of phosphuretted hydrogen and hydriodic acid, is readily split into its constituents when brought in contact with water, or better, with dilute solution of potassa. Hofmann recommends that a mixture of iodphosphonium and glass, broken into fragments the size of a lentil, be introduced into a cylindrical glass vessel provided with a rubber stopper, perforated with two holes, into which a safety-tube and a delivery-tube are placed. Dilute solution of potassa is allowed to flow upon the mixture drop by drop, whereby, without the necessity of heating, a regular current of pure phosphoretted hydrogen is produced. The operation may be readily stopped and again started at a moment's notice.

Iodphosphonium is most readily prepared by Bayer's method, which is as follows: 100 grams of phosphorus are dissolved in anhydrous bisulphide of carbon contained in a tubulated retort; this is then well cooled, and 175 grams of iodine gradually added. The bisulphide of carbon is then distilled off, and after allowing the retort contents to cool it is provided with a long and wide condensing-tube of thin glass, and this, with a tube of small diameter, dipping into a flask containing water, but not coming in contact with the latter. 50 grams of water are now poured upon the contents of the retort through a funnel-tube, in very small portions at a time, each addition producing lively reaction; iodphosphonium condensing in the upper portion of the retort, its neck, and in the condensing-tube, while a little hydriodic acid passes through the condensing-tube and is condensed in the flask containing water. After all the water has been added the retort is heated, at first gently, and afterwards to faint redness, in order to volatilize all of the iodphosphonium into the condensing-tube. Upon cooling, the latter is broken, and iodphosphonium, in the form of sal-ammoniac-like masses, and weighing about 120 grams, is obtained. Ph. Centr. H., No. 43, 1875, p. 363.

Determination of Phosphorous Acid.—A. Prinzhorn and H. Precht find that phosphorous acid may be very conveniently determined by means of mercuric chloride. The phosphite is dissolved in hydrochloric acid, an excess of mercuric chloride is added, and the whole is heated upon a water-bath as long as mercurous chloride is deposited, for which about two hours are requisite. The deposit is collected upon a filter, washed, dried, and weighed. The filtrate may be used to control the result, by removing the excess of mercuric chloride with sulphuretted hydrogen, and any other bases that interfere with the determination in an appropriate manner, and then determining the phosphoric acid with magnesia mixture according to well-known methods. Ch. N., August 6th, 1875, p. 61; from Liebig's An. Ch., June, 1875.

Phosphorus Acids.—R. Rother communicates a paper on the basicity of the acids of phosphorus, in which he advances some views differing from those generally accepted. A. J. Ph., March, 1876, p. 109.

Trimeta-Phosphoric Acid.—C. G. Lindborn has prepared this acid and its salts of soda, potassa, ammonia, silver, baryta, lead, magnesia, iron (ferrous), manganese; also the double salts of baryta and soda, baryta and ammonia, baryta and potassa, strontia and soda, lime and soda, magnesia and soda, and cobalt and soda. With the weaker bases he was unable to obtain definite compounds. Ch. N., July 2d, 1875, p. 8; from Bul. Soc. Chim., Paris, No. 10, 1875.

Phosphoric Acid.—Berthelot and Longuinine have conducted a series of investigations which lead them to the conclusion that phosphoric acid is not a tribasic acid of the same kind as citric acid, as the third equivalent of a soluble base is separated from phosphoric acid by the feeblest actions, and even by dilution. In the instance of ammonia it appears that this third basic equivalent does not combine with the phosphoric acid, or if it combines at first it does not remain definitely united to the acid, but is gradually separated spontaneously and completely. Neither is phosphoric acid a bibasic acid in the same sense as are the sulphuric, oxalic, or tartaric acids. The second base, as alkalimetrical operations show, is not neutralized by phosphoric acid, and is entirely separated by the hydrochloric and nitric acids, and gives indications of division even with acetic acid. In short, the three equivalents of base, united in the phosphates considered as normal, are combined in different and unequal manners. Phosphoric acid must be regarded as a monobasic acid of a mixed function. Ch. N., January 7th, 1876, p. 9; from Compt. Rend., December 6th, 1875.

Benoit proposes neutral crystallized nitrate of bismuth for the titration of phosphoric acid, 68.50 grams of which are dissolved in 200 grams of nitric acid of sp. gr. 1.55, and the solution brought with water to the measure of 1000 c.c. One c.c. of such a solution corresponds to one centigram of anhydrous phosphoric acid. 2 grams of the phosphate to be tested are dissolved in 50 grams of distilled water, acidulated with 10 drops of nitric acid, heated to boiling, and the test solution is then allowed to flow in as long as a precipitate is produced. The precipitate may, if desirable, be then determined analytically by drying it at 100° C. (= 212° F.), and weighing. It contains 0.2306 per cent. anhydrous phosphoric acid. Obviously the process may be employed for determining bismuth (see Bismuth, in this report). Ph. Centralhalle, No. 35, 1875, p. 290.

E. W. Parnell, while agreeing with Ogilvie that accurate estimations of phosphoric acid cannot be made by the magnesic method in presence of a notable quantity of some salts of ammonia, differs from the opinion that an accurate determination cannot be made if large excess of magnesia be used. The "ammoniacal solution of magnesia" (one-third of the strength used by Ogilvie is recommended) must be added slowly with constant stirring. Jour. Ch. Soc., May, 1876, p. 745; from Ch. N.

Diluted Phosphoric Acid.—At the last meeting of the Association papers on diluted phosphoric acid were read by L. Dohme, J. P. Remington, and G. F. H. Markoe. The papers of Dohme and Remington treat of the conversion of glacial into tribasic phosphoric acid. Both authors recommend that the diluted acid be made from the phosphorus direct, since the glacial acid of commerce contains a large percentage of phosphate of sodium. Markoe's paper recommends the preparation of phosphoric acid from phosphorus by adding a little bromine, or bromine and iodine, to the nitric acid and phosphorus. The bromine combines with some phosphorus, forming pentabromide of phosphorus, which is decomposed by water into phosphoric and hydrobromic acids, and the latter again yields bromine by the action of the nitric acid. With a small quantity of bromine a continuous and rapid conversion of a large quantity of phosphorus into phosphoric acid may be accomplished in a comparatively short time. Proceedings, 1875, p. 677.

Dr. W. H. Pile operated by Prof. Markoe's process, but unfortunately added the bromine *at once instead of drop by drop*, the addition resulting in an almost instantaneous explosion, and considerable injury to the operator. Prof. Markoe has since suggested, in a letter to Dr. Pile, that the bromine be first dissolved in the nitric acid: 12 ounces each of water and of nitric acid, sp. gr. 1.42, are mixed, then 4 c.c. of bromine added, and shaken until dissolved; 10 grains of iodine are now added, and afterwards 2 ounces of phosphorus; the reaction commences at once, and at the end of an hour may be sufficiently brisk to cause the escape of bromine, when it becomes necessary to place the flask in water (of about 55° F.). No further precaution need now be taken until the phosphorus is dissolved, which requires about twenty-four hours. Dr. Pile has since operated by the modified process, and finds it entirely satisfactory. A. J. Ph., November, 1875, p. 524, and December, p. 529.

Prof. P. W. Bedford gives explicit directions for preparing the acid by Markoe's method as originally communicated. Dr. Cir., November, 1876.

Referring to Markoe's process for preparing dilute phosphoric acid, A. D. Prescott suggests that while, with due precautions, bromine and iodine, or both, may be safely used with the nitric acid, the action of nitric acid, *just as the Pharmacopœia directs* in its first process, works exceedingly well, and that any pharmacist can use the process. Dilute phosphoric acid should be made from phosphorus, since all the *solid* glacial phosphoric acid of commerce contains phosphate of sodium. The Pharmacist, February, 1876, p. 38.

E. B. Shuttleworth maintains that nitric acid of sp. gr. 1.24 may be safely used in the preparation of phosphoric acid from phosphorus. The closest attention of the operator is, however, required throughout, and should the action become violent by reason of too great concentration of the acid, or too high a temperature, cold water must be at once added. The latter is objectionable, however, and may be overcome by the following modification of the process: The employment of a partially or almost closed vessel resembling a tubulated long-necked matrass, and of ten gallons capacity. The use of a water-bath, the temperature of which can be quickly reduced by the addition of cold water, and the action thus checked without diluting the acid. At the commencement, 1 lb. of phosphorus, 24 lbs. of nitric acid sp. gr. 1.315, and 6 lbs. of water are used. Further quantities of phosphorus of like amount are successively added as dissolved, together with additions of 8 lbs. of acid sp. gr. 1.315. Further additions of water are seldom or never required. The quantity of acid consumed during the operation ranges from 72 to 78 lbs., 67.72 lbs. being the theoretical amount required. The acid is evaporated as much as possible in the matrass, from which the upright neck has been removed, and is finally evaporated in platinum or porcelain. The statement of Mr. Dohme (Proceedings, 1874, p. 431) that the concentration should not be carried beyond a temperature of 450°, because the product will occasion a precipitate with solution of ferric chloride if it has been heated above that temperature, is found incorrect, the contrary being true in the author's experience. He had been in the habit to carry the heat as far as incipient redness, and the diluted acid prepared from the cooled solid mass, always mixed without precipitation with ferric chloride solution. Under certain conditions the product may not occasion a precipitate when Mr. Dohme's directions in regard to temperature are followed; but in an instance cited by Mr. Shuttleworth it did occasion copious precipitation. The conclusions arrived at by Mr. Dohme do not, therefore, always hold good, but are dependent on certain conditions not yet perfectly understood. Can. Ph. Jour., February, 1876, p. 229.

BORON.

Boracic Acid.—G. Krause communicates the method by which boracic acid is obtained from *Stassfurtite.* This mineral, which is a variety of boracite, containing 62.57 per cent. of boracic acid before being delivered to the market, is washed so as to remove the foreign salts. The ground ore is introduced into leaden troughs and reduced to a paste with water, heated, and the solution of the foreign salts drawn off through an opening fitted with wire gauze. It is again slightly washed with water, and the remaining mineral is heated with water and hydrochloric acid, in the proportion of 300 kilos. of the former and 150 kilos. of the acid at 1.16, to 105 kilos. of the mineral. The acid solution is decanted, and on cooling deposits crystalline boracic acid, which is pressed between cloths, washed with water, and dried. Ch. N., June 23d, 1876, p. 260; from Bull. de la. Soc. Chin., May 20th, 1876.

Malvern W. Iles has incidentally discovered that when boracic acid or a borate is moistened with glycerin, and then subjected to the blowpipe flame, the glycerin burns with a bright green flame. Comparing this reaction with the flame test proposed by Turner, who uses fluoride of boron, produced from a borate by the use of a mixture of acid sulphate of potassium, and fluoride of calcium, he finds this flame reaction to be far more delicate, and this is true for a very large number of borates examined in this way by the author. In regard to the alcohol and sulphuric acid test, the author remarks that the flame is yellowish-green, whilst by the glycerin test the flame is deep grass green. Moreover, the alcohol and sulphuric acid test is apt to be fallacious when metallic chlorides are present, as the chloride of ethyl formed under these circumstances communicates a green color to the borders of the flame. Am. Chem., April, 1876, p. 361.

CARBON.

Animal Charcoal.—At the works of Dunod and Bougleux, at Aubervilliers, near Paris, enormous quantities of animal charcoal are produced annually, as well as corresponding quantities of by-products resulting from the treatment to which the bones are subjected. The bones, which are first sorted, are crushed between two large cylinders provided with teeth, and the crushed mass is subjected to the action of boiling water and steam, whereby a considerable quantity of grease is extracted. The bones are then thrown into heaps to dry, during which the temperature rises to 140° or 160° F., and the mass ferments, with the result of producing a vast number of maggots. When dry enough the bones are screened, the portion passing through the screen furnishing, upon grinding, a very valuable manure, containing an average of 4 per cent. of nitrogen and 40 per cent. of phosphate of calcium. The carbonization of the bones is conducted in retorts constructed similar to gas retorts, the condensable products being carefully saved, and the gas is allowed to escape. One ton of bones yields about 7.5 cubic feet of ammoniacal liquor charged with an empyreumatic oil, which is an article of commerce, and is separated by decantation. The ammoniacal liquor is worked up for sulphate of ammonia, about 15.5 to 17.5 lbs. of which are obtained from the liquor yielded by 220 lbs. of bones. The products of the establishment that are obtained from bones are: charcoal, coarse, medium, fine, and impalpable; empyreumatic oil, bone fat, superphosphates of bones and charcoal for manure, bone powder, sulphate of ammonia, blanched bones for cupellation. The Pharmacist, January, 1876, p. 19; from Engineering.

Melsens has made a series of comparative experiments on the absorption and condensation of dissolved bodies, including coloring matters, from an industrial point of view. He considers that chemically pure charcoals have no decolorizing action. Boneblack, or animal charcoal, is solely employed in the arts, as it has a well-marked power of absorbing either coloring matter or salts of lime, and any excess of lime contained in saccharine liquids. The high price of boneblack has led to many attempts to find a substitute, but these experiments have not been successful. The author doubts whether the decolorizing action of boneblack is purely physical, as commonly supposed, and suggests that chemical processes may also be concerned. Ch. N., March 17th, 1876, p..117.

Monosulphide of Carbon.—Sidot drew attention some years ago to the formation of a red flocculent matter, and the evolution of a colorless gas, when bisulphide of carbon was exposed to light for some time. He has since repeated and continued his experiments, and finds that the colorless gas is ordinary atmospheric air, but that the flocculent matter is a definite compound composed of 1 equiv. each of carbon and sulphur (CS). The experiment was made in a long U-tube hermetically closed, in which the bisulphide was exposed for two months to direct sunlight. The flocculent substance was purified by heating with bisulphide of carbon and subsequent washing with cold bisulphide of carbon, and then constituted an odorless and tasteless chestnut-brown powder, insoluble in water, alcohol, turpentine, or benzin. Bisulphide of carbon or boiling ether dissolves mere traces. Boiling nitric acid dissolves it, forming a red liquid; fuming nitric acid ignites it; neither sulphuric or hydrochloric acid have any action upon it; boiling solution of potassa dissolves it with a black-brown color, and it is again precipitated from such solution by acids. It is decomposed at 200° C. (= 392° F.), sulphur being volatilized and carbon remaining. When heated with sulphur in excess bisulphide of carbon is again formed. The author proposes to continue his researches. Ch. C. Bl., 39, 1875, p. 610; C. Rend., 81, p. 95.

This compound, discovered by Sidot among the products of the decomposition of bisulphide of carbon under the influence of light, may be obtained, according to Sergius Kern, in the following manner: Crude bisulphide of carbon was introduced into a test-tube together with some pieces of clean and pure iron wire, the tube was then well corked and exposed for a month and a half in the author's laboratory, at the end of which time the bisulphide had been completely converted into protosulphide, which formed, along with bisulphide of iron, a reddish-brown precipitate, beneath some water, present as impurity of the bisulphide. The protosulphide of carbon, being nearly insoluble in hydrochloric acid, it is easily separated from the disulphide of iron by that acid; the CS is then liberated in form of reddish flocks, which, when dry, constitute an inodorous powder, insoluble in water or alcohol, nearly insoluble in bisulphide of carbon, and not acted upon by sulphuric or hydrochloric acids. Ch. N., June 23d, 1876, p. 253.

Bisulphide of Carbon may be purified and deprived of its disagreeable odor, according to Sergius Kern, as follows: The impure product is mixed in a high glass with some nitrate of lead and a small quantity of metallic lead; when the salt turns dark the liquid is poured into another bottle with a fresh quantity of the lead-salt, and this is repeated until the lead-salt remains white while mixed with the liquor. The bisulphide of carbon is then redistilled. The process is less tedious, and purifies the bisulphide more perfectly than that of shaking with mercury usually resorted to. Ch. N., October 1st, 1875, p. 163.

L. H. Friedburg has observed that when bisulphide of carbon, purified by distilling from palm oil (which is recommended as the most convenient means of purification on a large scale), is agitated with red fuming nitric acid, it takes up the vapor tetroxide of nitrogen, and both liquids acquire the same color. On adding cold water to the mixture the bisulphide assumes a rose-red to violet color, and when washed with water turns milky, but after filtering it forms a clear violet liquid, more highly refractive than the ordinary bisulphide. When this liquid is carefully distilled between 50° and 60° C. (= 122° and 140° F.), the bisulphide of carbon is obtained chemically pure, while the coloring matter remains as a solid, *brown*, acid, and readily decomposable matter, in very small quantity. Jour. Chem. Soc., May, 1876; from Deut. Chem. Ges. Berl.

P. Marquart shows that the violet coloration observed by Friedburg, on treating bisulphide of carbon with nitric acid, as described in the above paper, is due to iodine, which is almost always present in commercial nitric acid. Ibid.

Sulphocarbonates.—A. Gelis has by his experiments endeavored to throw some further light upon the nature and constitution of the sulphocarbonates, a class of compounds which has recently engaged the attention of chemists. The statements of Berzelius would seem to indicate that when a polysulphuret is acted upon by bisulphide of carbon it is decomposed, the ordinary sulphocarbonate (CS_2,MS) is formed, and sulphur separates. The author has found, however, that under these conditions a sulphocarbonate of composition CS_2,MS_2 is formed, and that this compound is always formed when more than one equivalent of sulphur is combined in the alkaline sulphuret. Thus, by the action of bisulphide of carbon upon a disulphide, the compound CS_2MS_2 is formed, and no sulphur is separated; if a trisulphide or tetrasulphide is acted upon, a separation of sulphur occurs amounting respectively to one and two equivalents. The reaction is accompanied by much heat and may become dangerous unless repeated cooling is resorted to. The compound CS_2,MS_2 may also be produced from the ordinary sulphocarbonate by boiling with sulphur in excess.

The sulphocarbonates of the base MS_2 are readily distinguished from those of the base MS by their ready solubility in alcohol; the salts of the latter base being but sparingly soluble in even dilute alcohol. If a solution of the two salts, concentrated to 40° B., is mixed with alcohol, the sulphocarbonate of the base MS_2 remains in solution with the alcohol, while that of the base MS is precipitated and settles to the bottom of the vessel in the form of a liquid layer. This behavior explains some of the conflicting statements upon the solubility of the sulphocarbonates made by Berzelius, who had operated first upon the polysulphurets, and subsequently upon the monosulphurets, and consequently must have obtained salts of both bases. Ch. C. Bl. 38, 1875, p. 595.

A. Mermet recommends ammoniacal chloride of nickel as a delicate reagent for sulphocarbonates. Chloride of nickel is dissolved in water, ammonia is added, and then sufficient water to make a colorless solution. A few drops of this solution added to a solution of a sulphocarbonate, produces a characteristic wine-red color, even when but mere traces of the latter are present. Monosulphide of potassium produces with the same reagent a brown or black color, and the Hepar sulphuris of commerce a yellow color. Ch. Centr. Bl., 38, 1875, p. 599; C. Rend., 81, p. 344.

Mermet and Delachanal communicate to Compt. Rend. (81, p. 92) a method for the determination of the bisulphide of carbon in sulphocarbonates, which is based upon the decomposition of the latter by a salt of lead, and the absorption of the bisulphide of carbon in olive oil. Ch. C. B , 38, 1875, p. 599.

Metallic Double Sulphocarbonates.—A. Mermet has observed that the salts of those metals, whose oxides are soluble in ammonia, such as nickel, cobalt, copper, and zinc-salts, produce precipitates with alkaline sulphocarbonates, which upon further addition of the precipitant are redissolved. A solution of a nickel salt obtained in this way yielded upon evaporation in vacuo handsome well-formed crystals of the double compound, which were permanent and capable of measurement. Ch. C. Bl., No. 37, 1875, p. 580; Compt. Rend., 81, p. 344.

Sulphocarbonate of Potassium is, according to Rommier, dissociated in the presence of ammoniacal salts; the sulphocarbonate of potassium losing a portion of its sulphide of carbon. Ch. N., July 2d, 1875, p. 8; from Compt. Rend., No. 22, 1875.

Carbonic Acid.—V. Pettenkofer recommends *rosolic acid* as a sensitive reagent for the presence of free carbonic acid in solutions containing bicarbonates of the alkalies and alkaline earths. 1 part pure rosolic acid is dissolved in 500 parts alcohol of 80 per cent., and neutralized with caustic baryta, until a reddish color begins to form. 0.5 c.c. of this test-solution is added to the liquid to be tested (mineral waters, etc.), when the liquid will remain colorless if it contains free carbonic acid, while if free from uncombined carbonic acid, and if it contains carbonates or bicarbonates, a red color is immediately produced. The reaction depends upon the destruction by the free carbonic acid of the red color produced by the carbonates. Ch. C. Bl., No. 36, 1875.

CYANOGEN.

Hydrocyanic Acid.—Sokoloff has recently shown the possibility of detecting hydrocyanic acid after twenty-two days had passed. He says that it will not be found in the first distillate of the contents of the stomach with dilute sulphuric acid, but it will be found in the second. This seems to show that hydrocyanic acid does not exist in the body as a single compound, but as a double cyanide, which is not easily decomposed by a dilute acid. A. J. Ph., December, 1875, p. 536; from Ny Pharm. Tid., 1875, p. 325.

Cazeneuve attributes the ready decomposition of hydrocyanic acid to the presence of cyanide of ammonium, a portion of ammonia being readily formed during the process of its formation. He states that cyanide of ammonium changes in a short time, forming a series of isomeric and polymeric compounds which require further investigation. Arch. Ph., October, 1875, p. 374; from Rep. de Ph., 1875, p. 225.

Cyanate of Potassium.—Chichester A. Bell recommends the following method for rapidly and conveniently preparing cyanate of potassium, no previous acquaintance with the process being necessary to success: 4 parts of perfectly dried and finely-powdered ferrocyanide of potassium are intimately mixed with 3 parts of dry and pulverized bichromate of potassium. This mixture is then heated in a porcelain or iron dish until a tender- (tinder-?) like combustion takes place, and the mixture blackens, which happens considerably below a red heat; the mixture being added in small quantities at a time and each portion allowed to blacken completely before adding the next. When all has been thus treated the dish is allowed to cool completely, the porous black mass is extracted by boiling alcohol, the solution filtered, and allowed to crystallize; sufficient alcohol being used to extract all the cyanate at one operation. The crystallization may be hastened by cooling the hot alcoholic solution in cold water. Forty-two per cent. of cyanate may be thus obtained under favorable circumstances; such containing but about 1 per cent. of impurity. To prepare the insoluble cyanate of lead, silver, etc., the black mass may be exhausted with water, the filtrate treated with nitrate of barium to remove the chromate and any unaltered ferrocyanide, and final precipitation with a nitrate of the desired metal. (See also Urea, in this report.) Ch. N., August 27th, 1875, p. 99.

Cuprocyanides.—A. Vidau draws attention to a series of new compounds, *Cuprocyanides*, which are analogons to the already well-known ferrocyanides. *Cuprocyanide of potassium* is obtained by the following method: Oxide of copper is precipitated from a solution of the sulphate by means of hydrate of sodium or potassium, and the thoroughly washed precipitate is dissolved without heat in a sufficient quantity of solution of pure cyanide of potassium, care being taken that the oxide be in excess. The result of the operation, after being filtered, is a colorless solution, which, when slowly and cautiously evaporated, deposits perfectly white crystals. The salt shows an alkaline reaction. The distinctive characteristics of the cuprocyanides are the following: Their behavior with the soluble salts of silver, by which a black precipitate is produced, soluble in excess of the reagent and in ammonia; their behavior with strong acids, hot and cold, by which a white curdy precipitate, soluble in excess of the reagent, is produced; and the metallic stain left on an iron blade by their solutions acidulated with muriatic acid. Another compound of copper, cyanogen and potassium, is readily obtained by treating an excess of freshly precipitated suboxide of copper (from sulphate by glucose) in solution of cyanide of potassium, filtering the brown liquor, and gently evaporating to crystallization. The salt forms light-brown crystals, which possess nearly the same reaction as the above-named colorless salt. Dr. Circ., February, 1876, p. 41; from Rép. de Pharm.

Sulphocyanides.—A. Dupré finds that in the determination of traces of sulphocyanides by ferric salts it becomes necessary first to remove any phosphates that may be present, since these have a tendency to destroy or prevent the color reaction. In his experiments he found this to be true for the phosphates, pyrophosphates, as well as metaphosphates, and that the influence of ordinary phosphate is least, while metaphosphates are the most powerful of all, it being about five times as powerful as corrosive sublimate. If it is not desirable to remove the phosphates, a large excess of the iron salt will obviate the difficulty. It had already previously been noted that oxalic acid and oxalates possess similar action in destroying the color of sulphocyanide of iron. Ch. N., July 9th, 1875.

Fulminate of Mercury.—A. Steiner finds that this compound is readily dissolvable in ammonia solution, which indeed is capable of dissolving four times its weight at 30–35° C. (= 86–95° F.) and then depositing it unchanged and in the crystalline state upon cooling. If the solution is heated to 60° C. (140° F.) the fulminate is decomposed, binoxide of mercury is deposited, and urea, guanidin, etc., are formed. By the action of sulphydric acid (perfectly dry) upon fulminate of mercury under anhydrous ether a compound of the composition $C_5H_8N_4O_6S_2$ (O = 16) is formed, which is very liable to undergo spontaneous decomposition, with formation of carbonic and sulphocyanic acid, and deposition of sulphur. Liebig, Kekulé, and others supposed that by the action of sulphydric acid the fulminate was directly decomposed into sulphocyanide of ammonium and carbonic acid. Ch. C. Bl., No. 45, 1875, p. 706.

POTASSIUM.

New Reaction for Potassium Salts.—Stolba has found the behavior of various boro-fluorides to solutions of salts of potassium to serve an excellent purpose for the determination of the latter in some instances. Conc. solutions of boro-fluoride of sodium, ammonium, or iron, afford with solutions of a potassium salt distinctly crystalline precipitates, which settle rapidly, and when washed with a little dilute alcohol, the crystals produced evidence under the microscope, of a crystalline character apparently in the orthorhombic form.

Boro-fluoride of potassium is soluble in 223 parts of water, at the ordinary temperature, and requires nearly 16 parts at 100° C. (= 212° F.), and is therefore one of the least soluble of the potassium compounds; the chloro-platinate requiring at the ordinary temperature 100, the bitartrate 240, and the fluosilicate 833 parts of water. The presence of fluosilicates in the solution of boro-fluoride must be carefully avoided, as the former would precipitate, along with the potassium, also any sodium that might be present. The presence of such is detected readily by means of salts of barium, which readily afford precipitate with silico-fluorides, but are not affected by boro-fluorides. Ph. Centralhalle, No. 31, p. 259.

Pure Carbonate of Potassium.—It is scarcely possible to obtain pure carbonate of potassium from ordinary pearlash, or even by incinerating nitre and charcoal; the latter usually containing traces of cyanide which are difficult to remove. L. Siebold prefers to prepare it from cream of tartar, by washing this with dilute hydrochloric acid, then with distilled water, recrystallizing, drying, and incinerating the crystals. So obtained, it is absolutely free from chloride, sulphate, phosphate, and silica, and also from sodium, an impurity rarely absent in even the best commercial specimens of pure carbonate of potassium. Ph. J. Trans., Dec. 4th, 1875, p. 441.

Bicarbonate of Potassium.—C. H. Dibbits has ascertained the following solubilities of bicarbonate of potassium in 100 parts of water, at the different temperatures named:

At 0° C. (= 32° F.), 22 45 parts.
" 5° C. (= 41° F.), 25 00 "
" 10° C. (= 50° F.), 27.70 "
" 15° C. (= 59° F.), 30.40 "
" 20° C. (= 68° F.), 33.20 "
" 25° C. (= 77° F.), 36.10 "
" 30° C. (= 86° F.), 39 00 "
At 35° C. (= 95° F.), 42.05 parts.
" 40° C. (= 104° F.), 45.25 "
" 45° C. (= 113° F.), 48 60 "
" 50° C. (= 122° F.), 52.15 "
" 55° C. (= 131° F.), 55.90 "
" 60° C. (= 140° F.), 60.00 "

Zeitsch. Oest. Ap. Ver., No. 27, 1875, p. 442.

Pure Nitrate of Potassium may, according to L. Siebold, be easily obtained from the commercial nitrate by repeated and interrupted recrystallization, as there is a much greater difference between its solubility in hot and cold water than is the case of the sodium salt (which see). Ph. J. Trans., Dec. 4th, 1875, p. 441.

Lead in Chlorate of Potassium.—A. Hilger states that among the impurities usually found in commercial chlorate of potassium, lead is also occasionally found, and has not hitherto been drawn attention to. To remove it completely, repeated recrystallization is necessary, and recommended as the best method. The presence of lead may be determined by sulphuretted hydrogen, but more readily by means of neutral-chromate of potassium. Ph. Centralhalle, No. 33, 1875, p. 273.

Perchlorate of Potassium.—Solubility in Water.—M. Pattison Muir has ascertained the following solubilities of perchlorate of potassium in water at different temperatures: One part of perchlorate of potassium is soluble in 142.9 parts of water at 0° C. (= 32° F.); in 52.5 parts at 25° C. (= 77° F.); in 15.5 parts at 50° C. (= 122° F.); in 5.04 parts at 100° C. (= 212° F.). For each rise of 25° C. (= 45° F.) the solubility and the percentage of salt in solution increase in round numbers threefold. Ch. N., Jan. 14th, 1876, p. 15.

SODIUM.

Reagent for Alkalies or Acids.—Stevenin extracts violet or malva flowers in *perfectly neutral glycerin* for two days and then heats for a few moments upon a water-bath. The resulting solution keeps well; becomes greened by alkalies, and deep red by acids. Dry mallow flowers will answer very well. Arch. Ph., October, 1875, p. 369; from Rép. de Ph., 1875, p. 233.

Monosulphide of Sodium.—Formation of Crystals.—E. Baudrimont has found that when sulphydric acid is passed into solution of caustic soda of 36° B. (according to the method of the Codex), and especially 40° B., at a temperature not exceeding 15° C. (= 59° F.), acicular crystals almost immediately begin to form, having the composition of $NaS, 6H_2O$ ($O = 16$). Very soon these crystals give place to a magma of octahedral crystals having a square base, consisting of monosulphide with nine molecules of water. The formation of these crystals is dependent upon the slight solubility of the monosulphide in caustic soda, which is in excess at the commencement of the operation. It is much more difficult to crystallize it from an aqueous solution, and when melted in its water of crystallization will frequently not again resume the solid form. If the solution of caustic soda is supersaturated with HS a true sulphydrate is formed, but this, by the ebullition necessary in concentrating, loses its excess of HS, and the true monosulphide is formed. The experiments were made for the purpose of settling a controversy as to the formation of monosulphide or sulphydrate by the process of the Codex, which directs that HS be passed into caustic soda solution of 36° B. until no more gas is absorbed. Ph. J. Trans., July 17th, 1875, p. 55.

Chloride of Sodium.—Purification.—L. Siebold recommends the following method for the preparation of a chemically pure product: The iron present in the filtered solution of common salt is peroxidized by chlorine, and solution of chloride of barium is then added in sufficient quantity to remove the sulphuric acid; the filtered solution is mixed with excess of pure carbonate of sodium and is boiled for an hour, so as to precipitate the calcium, magnesium, and iron, along with the excess of barium. The filtrate is evaporated to dryness, the residue dissolved in water, the filtered solution again evaporated, and the residue once more dissolved. This solution when filtered, neutralized by pure hydrochloric acid, and evaporated, leaves the salt in a chemically pure condition. Ph. J. Trans., December 4th, 1875, p. 442.

Carbonate of Sodium.—Purification.—Pure crystallized carbonate of sodium is easily obtained, according to L. Siebold, by repeatedly crystallizing the commercially pure salt. To obtain the pure anhydrous carbonate from bicarbonate by washing and subsequent heating, it is necessary to remove the moist carbonate from the funnel repeatedly, rendering the mass homogeneous by trituration with water, and again washing, until the washing no longer affords a precipitate with nitrate of silver or chloride of barium in the presence of nitric acid. At least four fluid ounces of the washings should be submitted to each test at a time. The removal of the moist bicarbonate from time to time is necessary, because it soon forms a compact mass, which is then not uniformly penetrated by the water. Ph. J. Trans., December 4th, 1875, p. 441.

Bicarbonate of Sodium.—C. H. Dibbits has ascertained the following solubilities of bicarbonate of sodium, in 100 parts of water, at the different temperatures named:

At 0° C. (= 32° F.),	6.90 parts.	At 35° C. (= 95° F.),	11.90 parts.
" 5° C. (= 41° F.),	7.45 "	" 40° C. (= 104° F.).	12.70 "
" 10° C. (= 50° F.),	8.15 "	" 45° C. (= 113° F.),	13.55 "
" 15° C. (= 59° F.),	8.85 "	" 50° C. (= 122° F.),	14.45 "
" 20° C. (= 68° F.),	9.60 "	" 55° C. (= 131° F.),	15.40 "
" 25° C. (= 77° F.),	10.35 "	" 60° C. (= 140° F.),	16.40 "
" 30° C. (= 86° F.),	11.10 "		

Zeitschr. Œst. Ap. Ver., No. 27, 1875, p. 442.

Nitrate of Sodium.—A solution of this salt, saturated at 0° C. (= 32° F.), and containing then 66.7 parts of salt in 100 parts of water, may, according to the experiments of A. Ditte, be cooled down to —15.7° C. (= 3.74° F.) before crystallization sets in. These crystals are neither the ordinary rhombohedrons nor the prisms which this salt is known to form, but are small laminated plates composed of extremely fine needles placed side by side. As these crystals melt again at —15.7° C. (= 3.74° F.), it is evident that the liquid is not a mere solution, but a definite hydrate, whose formula would be $NaNO_3,7H_2O$. Above 0° C. (= 32° F.) the solubility of nitrate of sodium increases with the temperature; between 0° C. (= 32° F.) and —15.7° C. (= 3.74° F.) it is constant, and below the latter temperature it decreases again. J. Chem. Soc., August, 1875, p. 734; from Compt. Rend., l. xxx, 1164–1167.

Saltpetre.—Deposits in Peru.—George Fitzroy Cole, late District Engineer of the Iquique and Lanoria Railway, has communicated an interesting paper on the saltpetre deposits of Peru, which is republished in the extract in Pharm. Jour. and Trans. (October 2d and 16th, 1875, pp. 264 and 305). The author had exceptionally favorable opportunities to become familiar with the industry as carried on in the province of Tarapacca, and with the geological character and geographical distribution of the deposits. The section specially dealt with in the author's paper lies at the southern extremity of Peru, in the province above named, which is more familiarly known as the district lying inland of the ports Patillos, Iquique, Mexillones, and Pisagua. The saltpetre deposits, called "caliche," lie at a depth of from one to ten yards below the surface of the vast, elevated plateau known by the name of Pampa de Tamarugal, which at a height of 3440 feet, extending southward and northwards, measures about 300 miles, and extends eastward, with a slight rise towards the Cordillera, for 50 to 60 miles. This deposit sometimes resembles in appearance loaf-sugar, at others rock sulphur, and again it appears white, crossed with bluish veins. Its gravity varies from that of common salt to sandstone (average 2.41), according to the amount and nature of earthy matters it may be associated with. The nitrate dissolves freely in boiling water, leaving behind as residuum the earthy substance. The caliche is mined by sinking a shaft, sufficiently wide to admit a man, as far as the under side of the deposit, at which point the underlying earth is dug out in a circle for several feet. The chamber thus formed is charged with gunpowder, which on being fired disengages and throws to the surface the subterranean caliche, which is stacked in heaps and subsequently carted to the manufactory (officina). Here it is broken up by hand or steam crushers and the saltpetre extracted by boiling—now generally by steam—at a temperature of 220° to 240° F., the solution being of such strength that it deposits the nitrate on cooling. The author calculates that an area of 100 square miles may be assumed to be available for the extraction of saltpetre, and calculates that each square yard is capable of furnishing three quintals, and the total area 42,240,000 tons. A specimen of white caliche gave on analysis 48 per cent. nitrate of sodium, 40 per cent. common salt, 12 per cent. insoluble matters; a specimen of yellow caliche, 55 per cent. nitrate of sodium, 35 per cent. common salt, 10 per cent. insoluble matters (containing sulphur).

Pure Nitrate of Sodium.—L. Siebold recommends its preparation from pure nitric acid and pure carbonate of sodium. Its purification from commercial nitrate of sodium by repeated recrystallization is not possible, and while that method may serve for a product sufficiently pure for pharmaceutic uses, it is never entirely free from chloride and sulphate. Ph. J. Trans, December 4th, 1875, p. 441.

AMMONIUM.

Natural Formation of Ammonia.—The observations of Schlösing lead him to the opinion that by the influence of atmospheric electricity, continuous nitrification occurs upon the surface of the continents at the expense of the N and O of the atmosphere. A portion of the nitrates so formed is consumed at the place of its formation, while the remainder is carried to the ocean by the water-courses, is there reduced to ammonia by its organized inhabitants, and thence again enters the atmosphere. The ocean may, therefore, be regarded as an immense ammonia reservoir from which the atmosphere supplies itself indefinitely. Numerous analyses prove sea-water to contain $\frac{4}{10}$ milligram of ammonia per litre, a quantity which corresponds to 4000 kilograms per hectare of ocean surface. Arch. Ph., Oct. 1875, p. 355; from J. de Ph. et. de Chem., 1875, p. 209.

Bicarbonate of Ammonium.—C. H. Dibbits has ascertained the following solubilities of bicarbonate of ammonium in 100 parts of water at the different temperatures named:

At 0° C. (= 32° F.), 11.90 parts.	At 20° C. (= 68° F.), 21.30 parts.
" 5° C. (= 41° F.), 13.70 "	" 25° C. (= 77° F.), 23.90 "
" 10° C. (= 50° F.), 15.85 "	" 30° C. (= 86° F.), 27.00 "
" 15° C. (= 59° F.), 18.30 "	

Zeitsch. Œst. Ap. Ver., No. 27, 1875, p. 442.

Sulphate of Ammonium.—A. Esilman communicates a method for purifying the brown (crude) sulphate of ammonium produced from gas liquor, the production being carried on simultaneously with that of the ordinary sulphate. The crude sulphate contains large quantities of sulphocyanide, and the method consists mainly in the decomposition of this compound by sulphuric acid under certain technical conditions. The presence of sulphocyanides, however interesting to the experimental chemist, is of no value to the manufacturer, since the insignificant demand for these compounds acts as a complete barrier to their utilization. That the amount of these compounds is large may be judged from the circumstance that a lot of sulphate, when distilled with slaked lime, and the vapors conducted into acid, yielded 25 to 27 cwt. of white sulphate of ammonia per ton. A portion of this increase is owing to the formation of ammonia from the nitrogen of the sulpho-cyanogen. In the absence of ferric salts, such contaminated sulphate may not show the slightest abnormal color. Ch. N., Oct. 22d, 1875, p. 197.

LITHIUM.

Bromide of Lithium.—Yvon recommends the two following methods for its preparation :

1. 37 grams of carbonate of lithium are suspended in 200 grams of distilled water, and 80 grams of bromine added. A current of sulphuretted hydrogen is then passed through the mixture until the whole of the bromine has disappeared ; slight heat is then applied to drive off the excess of sulphuretted hydrogen, and to agglutinate the sulphur. The filtrate is concentrated to syrup, and crystallized over sulphuric acid ; or it may be dispensed in solution of definite strength.

2. Sulphate of lithia is first prepared by treating 37 grams of carbonate of lithium with 49 grams of monohydrated sulphuric acid diluted with its own volume of water. 119 grams of bromide of potassium are dissolved in the smallest possible amount of water, the solution is mixed with that of the sulphate of lithium, and the separation of the sulphate of potassium is facilitated by stirring or the addition of a little alcohol. The bromide of lithium is obtained perfectly free from sulphate by evaporating the whole to dryness, and extracting with alcohol. Ph. J. Trans., Sept. 18th, 1875, p. 221 ; from Rép. de Pharm., Sept. 1875.

Carbonate of Lithium.—A. W. Hoffmann communicates a method for its preparation from lepidolith, which is stated to be that pursued in the manufactory of E. Schering. The lepidolith is heated with sulphuric acid, finally, in a reverberating furnace ; the cooled mass is exhausted with water, and the solution is treated with milk of lime to faint alkalinity. It is then filtered and precipitated with carbonate of potassium, whereby the carbonate is obtained in form of a sandy powder. To obtain it in the light pulverulent form preferred in commerce, this sandy powder is dissolved in muriatic acid, and reprecipitated by carbonate of ammonium. It is mainly exported to England and the United States. Ph. Centr. Halle, No. 10, 1876, p. 83.

F. Filsinger communicates essentially the same method for the production of carbonate of lithium from lepidolith, which seems to have been devised by him, and applied in the manufactory of Schering. The author has, furthermore, studied the compounds of lithia with boric acid, and has obtained and determined three distinct modifications, viz.:

1. $LiO,2BO_3 + 5HO$.
2. $LiO,3BO_3 + 6HO$.
3. $LiO,4BO_3 + 10HO$.

These compounds are readily soluble in water, and all possess alkaline reaction, the alkalinity being weaker as the acid is present in larger proportion. They are all insoluble in alcohol. Arch. Ph., March, 1876, pp. 198 to 219.

Bisulphate of Lithium.—This salt is obtained by H. Lescoeur, by the use of monohydrated sulphuric acid. It forms deliquescent crystals, which when dried consist of 51.87 per cent. of $LiOSO_3$, and 46.85 per cent. of free sulphuric acid. Theory requires 52.88 per cent. of sulphate of lithia and 47.12 per cent. of sulphuric acid. Its melting-point is about 120° C. (= 248° F.) Ch. N., Jan. 7th, 1876, p. 10; from Bull. Soc. Chim. de Paris, Dec. 5th, 1875.

STRONTIUM.

Sulphide of Strontium.—Sergius Kern recommends the following method for obtaining it pure: Conc. solutions of chloride of strontium and hyposulphite of sodium are mixed, and ordinary alcohol, or better, methylic alcohol is added, whereby hyposulphite of strontium is precipitated;* the precipitate is washed, dried, and strongly heated, whereby the hyposulphite is converted into sulphide and sulphate of strontium, and a little free sulphur. From this mass the sulphide is readily extracted by water, and may then be obtained in the pure and dry state by evaporation and drying over sulphuric acid. Ch. N., September 17th, 1875, p. 138.

CALCIUM.

Basic Phosphate of Calcium.—Falières gives the following method for preparing basic phosphate of calcium most suitable for making phosphate syrup and solutions: Mix 20 parts of bone-ash (white and finely powdered) in a dish with 20 parts of water, and add 32 parts of hydrochloric acid (sp. gr. 1.17), stirring from time to time.

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* Unless the author designs that a very small proportion of alcohol shall be used, a portion of chloride of sodium, large or small according to the amount of alcohol, must also be precipitated, and will contaminate the sulphide.—REP.

After some days' contact, add 10 parts of crystallized phosphate of sodium dissolved in 60 parts of water, and filter. To the liquor so obtained, add 15 parts of solution of ammonia, sp. gr. 923, and free from carbonate, and agitate vigorously with a strong osier besom. The mass assumes the appearance of thick plates, but by the beating finally assumes the consistence of thick soup. The precipitate is suspended in 200 or 300 parts of cold water, allowed to settle, and the supernatant liquor decanted; this operation being repeated five or six times. The precipitate is then collected, drained, shaped in moulds into lozenges, and dried in the open air. The product is readily passed through a sieve of 120 meshes to the inch, and retains fixed at the ordinary temperature at least 25 per cent. of moisture. Ph. J. Trans., May 6th, 1876, p. 882.

MAGNESIUM.

Powdered Magnesium.—The powerful electropositive character of powdery magnesium, renders this substance, according to R. Böttger, particularly available as a reducing agent for metallic salts. Such powdery magnesium, when added to the chlorides of copper, gold, zinc, etc., cause a separation of the respective metals in the spongy state at ordinary temperatures, the reaction being accompanied by copious evolution of hydrogen. Apoth. Zeit., No. 26, 1875, p. 101.

Carbonate of Magnesium.—J. C. Thresh has contributed a very interesting paper on commercial carbonate of magnesium. He examined seventy samples of commercial carbonate, among which twenty-seven of the ponderous variety. Of the latter but six contained iron, several gave slight traces of alumina, and fourteen gave traces of lime, while most of the samples contained traces of soluble salts, and eleven of them when boiled in water yielded an alkaline solution. With four exceptions the loss on ignition was as near as possible 58 per cent.; while the exceptions lost respectively 53.5, 55, 56, and 56.6 per cent. Of the forty-three samples of light carbonate of magnesium examined, only one was free from iron; only six were free from carbonate of calcium, while a much larger proportion of soluble salts was found in the light than in the heavy carbonates; but only in three cases was the reaction of the solution alkaline. The percentage of oxide of magnesium, in most cases, was 42 per cent. Ph. J. Trans., September 11th, 1875, p. 212; from Proc. Br. Ph. Conf.

ALUMINIUM.

Potassa Alum.—A. Naumann has observed that when a solution of potassa alum is heated to the boiling-point of water, a white precipitate is formed, which, after washing with water, is an amorphous powder with an admixture of glittering laminæ, and dissolves with difficulty in strong hydrochloric acid, but readily in potassa. This precipitate is a more or less basic compound of alumina, potassa, sulphuric acid, and water; containing 31.2 to 32.6 per cent. of alumina, about 11 per cent. of potassa, 30 to 40 per cent. of sulphuric acid and water. Jour. Ch. Soc., May, 1876, p. 682; from Deut. Ch. Ger. Ber., VIII.

MANGANESIUM.

Manganese.—Probable Existence of a New Oxide.—Fremy has succeeded in preparing larger quantities of the peculiar vinous-red liquid, which is familiar to most chemists as being formed in very small quantities from certain varieties of manganese during the preparation of oxygen. He considers that this liquid contains the sulphate of a new oxide, but reserves the details for a future communication. Ch. N., March 24th, 1876, p. 129; from Compt. Rend., February 28th, 1876.

Peroxide of Manganese.—T. L. Phipson states that the determination of peroxide of manganese, as ordinarily performed for commercial purposes, does not suffice to ascertain the value of this substance. Certain samples contain fluorine and phosphoric acid in very considerable proportion, and also a small quantity of arsenic acid. A peroxide of manganese much used in England, if digested for twenty-four hours in very dilute nitric acid, yields to the solvent a large quantity of phosphate of calcium, a little arsenic acid, traces of nickel and cobalt, much iron, and traces of indium. From this liquid sulphuretted hydrogen separates a little lead with arsenic acid and traces of copper. The filtrate mixed with excess of acetate of sodium and sulphide of ammonium deposits much phosphate of iron, with traces of indium, nickel, and cobalt, and the filtrate from this precipitate contains much phosphate of calcium. Ch. N., June 23d, 1876, p. 260; from Bull. de la Soc. Chim., May 10th, 1876.

Regeneration of Peroxide of Manganese.—Ch. Jesler proposes a method of regenerating peroxide of manganese from the chloride formed in the preparation of chlorine, as follows: The solution of chloride of manganese is mixed with thick milk of lime, using, however, only one-half or a little over one-half the quantity of the precipitant that is necessary for complete precipitation. The precipitate is collected upon filtering-paper spread upon sand, and as soon as it can be readily removed from the paper it is then heated for some time at a temperature of 30–40° C. (= 86–104° F.), water being added occasionally, and the mass being thoroughly stirred during the heating. When the mass has assumed a uniform black color, the greater part of the chloride of calcium formed is washed out, and the oxidation then completed at a high temperature. A basic compound of chloride of manganese and lime seems to be formed, which by oxidation is readily decomposed, yielding binoxide of manganese and chloride of calcium. The latter is finally completely removed by washing, and the regenerated binoxide, which varies in color from dark-brown to black, is particularly suitable for the generation of chlorine, no heat being required for its evolution until towards the latter part of the process. Ph. Centralhalle, No. 28, 1875, p. 234.

Permanganate of Potassium.—The application of sulphuric acid for neutralizing the free alkali in the solution of permanganate previous to its crystallization, as recommended by the B. P., is, according to the experience of L. Siebold, objectionable, as it is impossible to separate the sulphate without sacrificing a very large quantity of the permanganate. Carbonic acid is preferable, and yields a preparation which, when thrice recrystallized, is chemically pure. Stædeler's process of passing chlorine through the solution of the fused mass in cold water yields a much larger quantity than the ordinary method, but the chlorate invariably formed is difficult to remove. Ph. J. Trans., December 4th, 1875, p. 441.

FERRUM.

Perchloride of Iron possesses, according to G. Almés, various properties which hitherto had not been noted or but imperfectly understood. It has the power of preserving flesh and fish, when these are immersed in dilute solution of the salt; it precipitates the casein of milk and preserves the serum; preserves urine, but renders it slightly turbid; coagulates, but preserves blood; destroys the germinating power of grain, and prevents the fermentation of grain in the presence of yeast. It also prevents the formation of volatile oil when added to powdered mustard-seed or bitter almonds, and prevents alcoholic fermentation when added to grape-juice, honey, or sugar. Ph. Centralhalle, No. 17, 1876, p. 141.

Tasteless Iron Salts.—In a paper, read before this Association at its last meeting, C. Rutter asserted that the so-called tasteless iron salts were mere mixtures, but not definite chemical compounds. This assertion gave rise to some discussion, in which this view of their constitution was opposed.

Tasteless Iron Compounds.—R. Rother communicates a paper on the "Inverse Synthesis of the So-called Tasteless Iron Compounds," which is too lengthy for extraction, and will be read with greater advantage in the original, for which see A. J. Ph., April, 1876, pp. 171 to 178.

Ferrum Oxydat. Sacchar. Solub.—Solutions of this compound are precipitated by the chlorides of ammonium, sodium, and potassium (probably also by other chlorides), and by the alkaline acetates. The alkaline iodides, bromides, nitrates, sulphates, carbonates, bicarbonates, phosphates, and chlorates do not affect its solutions. The solution of oxide of iron, known as

Ferrum Dialysatum, is not only precipitated by the alkaline chlorides and acetates, but also by the sulphate, nitrate, phosphate, and bicarbonate of sodium. The above preparations should, as a rule, be prescribed without admixture with other saline compounds. Schweiz. Wochenschr. f. Pharm., No. 6, 1876, p. 45.

Saccharated Carbonate of Iron.—The estimation of ferrous carbonate in this preparation, according to the British Pharm., is defective, according to W. L. Howie, who finds that by the action of the hydrochloric acid the sugar is rapidly converted into invert sugar during the titration with bichromate of potassium, and the quantity of the latter indicated is, therefore, too high. He recommends the substitution of phosphoric for hydrochloric acid, which inverts sugar at ordinary temperature with comparative slowness. Ph. J. Trans., December 18th, 1876, p. 482.

Phosphate of Iron, Br. Ph.—Rees Price has observed that the phosphate of iron is not completely precipitated when the directions of the British Pharm. are followed. By experiments he proves that the difficulty is due to the presence of acetate of sodium, directed in the formula, and to the insufficiency of phosphate of sodium. He finds that the phosphate of iron is not completely precipitated until about three times as much phosphate of sodium has been added as sulphate of iron has been used, and on the basis of this observation he suggests the following modification of the officinal formula:

Granulated Sulphate of Iron, ...	224 grains.
Phosphate of Sodium, ...	660 "
Cold Distilled Water, ...	12 ounces.

Dissolve the iron salt in $2\frac{1}{2}$ ounces of the water, and the sodium salt in the remainder; mix the solutions, digest for a few minutes at a gentle heat with frequent stirring, and then allow the mixture to stand until the supernatant liquid has become clear, when collect the precipitate on a filter, wash, and, if intended for syrup, immediately dissolve in phosphoric acid. Apart from the insufficiency of phosphate of sodium in the officinal process, the use of acetate of sodium is a mistake, since phosphate of iron is soluble both in acetic acid and its sodium salt. Practically, the author finds 28.2 per cent. of phosphate of iron fails to be precipitated by the officinal process. Ph. J. Trans., March 4th, 1876, p. 701.

The author's observations, as regards the insufficiency of phosphate of sodium, apply with equal force to the formula of the U. S. Ph., which directs 5 parts of iron salt to 6 parts of sodium salt. —REP.

Ferric Ortho-Phosphate.—Fausto Sestini has observed that, contrary to the usual statement that the precipitate produced in solutions of ferric salts by a solution containing an ordinary phosphate, is insoluble in water and in acetic acid, such precipitate is not absolutely insoluble in acetic acid. He finds, furthermore, that its solubility in acetic acid is not augmented by the presence of chloride of ammonium, and that cold water withdraws a portion of phosphoric acid, while boiling water decomposes the salt, dissolves out the greater part of the phosphoric acid, and leaves the iron as an insoluble basic phosphate. Ch. N., August 13th, 1875, p. 68; from Gaz. Chem. Italiana.

Crystallized Ferric Sulphate.—O. Meister has observed crystals of ferric sulphate deposited from a commercial iron mordant after long standing, apparently belonging to the clinorhombic system, exhibiting combinations of the prism with the hemipyramids, and the basal and pinacoïdal faces, the two latter being most fully developed. On exposure to the air the originally hyacinth-red transparent crystals soon become coated with a reddish-yellow powder. They are but slightly soluble in a little water, but are decomposed when heated with it. They melt in their water of crystallization, giving up 35 to 36 per cent. of water at 110° to 115° C. (= 230° to 239° F.), and a further 10 per cent. when heated with oxide of lead. The analyses show a composition of $Fe_2O_32SO_3 + 15H_2O$ ($O = 16$). Jour. Ch. Soc., May, 1876, p. 680; from Deut. Ch. Ges. Ber., VIII.

NICKEL.

Chloride of Nickel and Ammonium.—The commercial chloride of nickel, which is very deliquescent, may with advantage be substituted by the much more stable ammonio-chloride, for which J. Eneu Loughlin gives the following process:

29.5 parts moderately finely powdered commercial nickel are dissolved in 103 parts of nitric acid, sp. gr. 1.38; the powdered solution is evaporated to one-half its original volume, mixed with 10 parts of distilled water (filtered?), and poured into a solution of 60 parts of carbonate of sodium in 180 parts of water. The carbonate of nickel is well washed, dissolved in 220 parts of hydrochloric acid, sp. gr. 1.164, the excess of acid is saturated with stronger solution of ammonia, and the solution is evaporated gently to dryness. The resulting greenish-yellow mass is readily soluble in cold water, and is particularly suited for yielding by battery action a brilliant deposit of metallic nickel.

Sulphate of Nickel and Ammonium may be prepared by dissolving the quantity of carbonate of nickel obtained as above, in 205 parts of dilute sulphuric acid containing 105.4 parts of acid of 66° B., neutralizing the excess of acid by ammonia, evaporating to one-half its original bulk, and setting aside to crystallize; or by dissolving the dry mass of nitrate of nickel, obtained as above, in 20 parts of water, heating the solution to boiling, adding whilst still boiling a solution of 60 parts of sulphate of ammonium in 180 parts of water, gradually evaporating until a pellicle forms, and setting aside to crystallize. Am. Chem., September, 1875, p. 90.

Pure Sulphate of Nickel, according to a writer in the "Scientific American," is readily prepared from commercial nickel, which is an alloy of nickel, copper, and iron, with traces of arsenic, as follows: The nickel is dissolved in 7 or 8 parts of aqua regia; the solution is evaporated to dryness; the dry mass is dissolved in water (about five times the weight of the nickel employed), and the solution is filtered. Metallic iron, preferably small nails, is introduced into the hot liquid, to about the weight of the nickel employed. As soon as a piece of bright iron, introduced into the liquid, is no longer coated with a film of copper, the whole is thrown upon a filter, the copper is collected by sifting it under water in a sieve coarse enough to let the metallic powder pass but retain the iron, and the copper is then dried and is marketable. To remove the iron from the filtrate, it is peroxidized, treated with 2 parts of sulphuric acid to 1 part of the nickel originally employed, evaporated to dryness to expel acids in excess, redissolved in water, and carbonate of barium, recently precipitated, is added in slight excess. Carbonate of iron and sulphate of barium are precipitated, and pure sulphate of nickel remains in solution. The filtrate is evaporated till a pellicle forms, and is set aside to crystallize. Can. Ph. Journ., Nov. 1875, p. 130.

Nickel Plating.—G. Boden recommends the following nickel bath for plating by the aid of a galvanic current: 4 parts nitrate of nickel dissolved in 4 parts of solution of ammonia and 150 parts of water in which 50 parts of bisulphite of sodium have been previously dissolved. By using a very weak galvanic current it is not necessary to remove the object to be plated from time to time, and to brush it off, as is the case when the ordinary methods are employed. When the object has been immersed a sufficient length of time, it only requires to be rubbed dry with sawdust, and will then be found handsomely plated. Apoth. Zeit., No. 26, 1875, p. 102.

To prevent the nickel coating, deposits upon objects of iron, steel, etc., by electrolysis, from scaling, H. T. Brownell recommends that the plated objects be dried as soon as they are removed from the bath, and then heated in an oil bath to 250–370° C. (= 482–698° F.). When so treated the plated objects may be bent or expanded without injury to the coating. Ph. Centralhalle, No. 26, 1875, p. 222.

URANIUM.

Uranium.—T. Fairley has observed that when binoxide of hydrogen is caused to act upon salts of uranium a yellowish-white precipitate was obtained, which when washed and dried at 100° C. (= 212° F.) proved to be a new oxide, which retained one atom of water, and corresponded to the empirical formula = UO_2,H_2O ($O = 16$). This oxide by its decomposition with alkaline hydrates is shown to be a compound of a higher (acid) oxide of uranium—UO_3 ($O = 16$), with uranic oxide U_2O_3 ($O = 16$). The author has prepared sodium, potassium, and ammonium compounds of the new acid. The sodium salts of the new acid is readily obtained by mixing strong solutions of uranic salt with excess of solution of binoxide of hydrogen (5 per cent.), and adding strong solution of soda in quantity sufficient to dissolve the precipitate. By means of binoxide of hydrogen uranium salts may be separated from all other metals, and in acetic solutions either uranic salt or binoxide of hydrogen may be used to titrate each other, using ferrocyanide of potassium as indicated. Ch. N., Nov. 5th, 1875, p. 219.

Uranium Salts.—Sergius Kern proposes ferrocyanide of potassium as a reagent for uranium salts. The brown precipitate produced by the ferrocyanide is distinguished from the corresponding precipitate produced in copper solutions by being soluble in hydrochloric acid; and this reaction serves to separate the two metals. The solution of ferrocyanide of uranium in hydrochloric acid produces a *green coloration* when it is boiled for some minutes after the addition of a few drops of nitric acid. Ch. News, January 7th, 1876, p. 5.

CHROMIUM.

Chromic Acid.—A dangerous prescription is drawn attention to in the "Ph. J. Trans." (Feb. 26th, 1876, p. 688). A pupil in a French pharmacy had been intrusted to put up a prescription composed of half a gram of chromic acid and four grams of glycerin; he dissolved the acid in a bottle in a little water, added the glycerin, when, upon shaking, violent explosion, accompanied by a loud report, occurred.

ZINCUM.

Phosphide of Zinc.—Pierre Vigier observes that much of the phosphide of zinc of commerce is composed largely of oxide and phosphate of zinc, which are readily formed by exposure to air during its preparation. The compound, which he believes is destined to find a wide application in medicine as a substitute for phosphorus, has, when properly prepared, the composition PZn_3, and may be obtained of this composition by the formula laid down in the work of Soubeiran, revised by Prof. Regnault. The product contains some uncombined zinc, which is removed by reducing the mass to fine powder, and sifting out the metallic zinc, which is not pulverized by the trituration. The product resembles iron reduced by hydrogen. Zeitschr. Oest. Ap. Ver., March 1st, 1876, p. 98.

GALLIUM.

Gallium is the designation given by Lecoq de Boisbaudran to a new metal, which he has discovered in zincblende from Pierrefitte in the Pyrenees. The author submits the following preliminary communication:

"The oxide—or perhaps the basic salt—of the new metal is precipitated from its solutions, which contain chlorides and sulphates, by metallic zinc, producing a precipitate which does not seem to be metallic. The chloride is precipitated by ammonia. From its solutions in admixture with zinc it is precipitated before the zinc, when insufficient ammonia is added, and the precipitated oxide is soluble in excess of ammonia. Its salts are precipitated by sulphydrate of ammonium, and the precipitate is insoluble in excess of the precipitant. The new body is likewise precipitated by sulphydric acid in the presence of acetate of ammonium and much free acetic acid; and if zinc is present the new metal is certain in the first portions of the precipitate; while from solutions in hydrochloric acid no precipitate results. The oxide is soluble in carbonate of ammonia, along with zinc, which tenaciously adheres to it, and which the author (owing to the small quantity of material) has not succeeded to separate completely. The new metal in concentrated solution with chloride of zinc produced a spectrum, which was composed chiefly of a narrow violet-colored and very distinct line, corresponding to a wave-length of 417; while a faint line was noticed at 404. Its salts are readily precipitated in the cold by carbonate of barium." Ch. C. Bl., No. 42, 1875, p. 658; Compt. Rend., 81, p. 493.

In addition to the facts published in his previous paper, M. De Boisbaudran adds further observations:

"In the presence of large quantities of zinc, ferrocyanide of potassium precipitates gallium and zinc together. The ferrocyanides, washed with hydrochloric acid, decomposed with sulphide of ammonium, and dissolved in hydrochloric acid, gave brilliant spectra of gallium and zinc. The chlorides are not decomposed by cadmium even on boiling. It may be sharply separated from its admixture with zinc as chloride, by fractional precipitation with carbonate of sodium. From an ammoniacal solution, containing sulphates or chlorides of the two metals, acetic acid precipitates white gelatinous flocks containing the gallium. Ammonia partly redissolves the precipitate it first occasions in a solution of the sulphate or chloride. The sulphate evaporated and dried until the vapor of sulphuric acid almost ceases to be evolved, is still soluble in water." J. Chem. Soc., April, 1876, p. 521; from Compt. Rend.

Delachanal and Mermet have also determined the presence of gallium, as well as of indium, in a solution of zinc, by the spectroscope. The source of the zinc was not ascertained. They succeeded to isolate small quantities of the metals. Ph. Centr. Hall., June 29th, 1876, p. 227.

CUPRUM.

Copper.—Determination of very small amounts.—J. M. Merrick communicates a method of determining small amounts of copper, which gives trustworthy results, even when the amount is much less than 0.5 milligram. The solution suspected to contain copper, is concentrated to a very small bulk, acidified with sulphuric acid, and introduced into a very small test-tube on a foot, cut off so as to give a vessel about one and a half inches deep. A platinum anode and cathode, each about one inch long and one-eighth of an inch or less wide, are then hung into the solution face to face, and very close together, and, the circuit being completed, very satisfactory depositions of copper are obtained with incredibly minute quantities of the metal. The amounts are determined by the increased weight of the cathode, and by the loss in weight of the same on washing it with nitric acid. The platinum must be polished and heated to redness before the first weighing, and gently heated before hanging in the solution. 0.1 milligram of copper may be then safely determined. Ch. N., March 17th, 1876, p. 111.

Sulphide of Copper is obtained, according to Champion and H. Pellet, by the action of a solution of sulphur in bisulphide of carbon on copper turnings. The excess of sulphur is removed by washing with bisulphide of carbon. Another method consists in precipitating a copper salt with pentasulphide of potassium, and washing out the excess of sulphur.

Phosphide of Copper is obtained, according to the same authors, by mixing commercial phosphide, which contains about 20 per cent. of phosphorus, with an excess of red phosphorus, and heating to dull redness till the excess of phosphorus is removed. The last traces of free phosphorus may be got rid of by heating gently in a current of hydrogen. J. Chem. Soc., April, 1876, p. 519; from Bull. Soc. Chim.

Phosphide of Copper, which is used occasionally in the manufacture of bronzes, has hitherto been usually prepared by the direct union of phosphorus and copper, the phosphorus being previous to their immersion into the melted copper coated with metallic copper by the well-known method of immersion into solution of sulphate of copper. H. Schwarz has devised a simple method by which the phosphide may be formed of unexceptional good quality and composition. 14 parts silica, 18 parts bone-ash, 4 parts powdered charcoal, 4 parts soda, and 4 parts powdered glass, are formed into a paste with gum-water; this is used for coating the inner surface of the crucible, dried, granulated copper introduced, and this then covered with the remainder of the mass. The crucible is then introduced into the furnace and its contents caused to melt at a red heat. A button of gray-red sulphide of copper, containing 0.51 per cent. of phosphorus, was thus obtained. A second experiment, in which the heating was continued longer, yielded a phosphide which contained 3.25 per cent. of phosphor, and which could consequently convert six times its weight of pure copper into phosphorus bronze. Ch. C. Bl., No. 46, 1875, p. 727.

Cuprous Oxide is proposed by Sergius Kern as a substitute for the more expensive pyrogallic acid now used in laboratories for the absorption of oxygen. It is readily prepared by boiling solution of sulphate of copper with sugar and excess of caustic potassa, and when dissolved in ammonia absorbs oxygen freely; the colorless solution being turned blue by the formation of cupric oxide. The solution of the latter may again be restored to cuprous oxide by the immersion of a clean copper wire. Ch. News, January 7th, 1876, p. 5.

STANNUM.

Tin.—Detection of Lead.—On page 34 of last year's report (Proceedings, 1875) the method of Fordos, for determining the presence of lead in the tin lining of vessels, is referred to. This is dependent on the formation of iodide of lead, when a spot is first touched with nitric acid and then with a solution (5 per cent.) of iodide of potassium. Alb. Pürkhauer has found that the mere formation of a yellow spot, under these conditions, cannot be regarded as conclusive evidence of the presence of lead in such lining, since the same result may occur when the tin is absolutely pure, owing to the liberation of iodine by the free acid. The reaction, however, cannot lead to error, if a drop of very dilute solution of potassa is placed on the spot before the addition of the iodide of potassium solution. The free acid being thus neutralized, iodine can no longer be liberated. Ph. Centralhalle, No. 22, 1876, p. 187.

TITANIUM.

Titanium.—Analogy to Silicium.—C. Friedel and J. Guerin find that titanium in a certain number of its compounds is unquestionably analogous to silicium. This has in some analogies already been pointed out by Marignac. Other analogies result from the comparison of the chlorides, bromides, and iodides of silicium and of titanium, and between the ethereal compounds of titanium and the ethyl-titanic trichlorhydrin of Friedel and Crafts, and the titanic ether of Demarcay. Along with these resemblances there are also differences. None of the silicates resemble those of the titanates. Of the three forms of crystalline titanic acid, not one approaches that of silica. The authors, therefore, deemed it important to undertake a re-examination of certain compounds of titanium, and have studied the dichloride and the dititanic hexachloride. Ch. N., December 10th, 1875; from Comp. Rend., November 15th, 1875.

Preparation of the Metal.—Sergius Kern attributes the property of metallic titanium to decompose water readily at 100° C. (= 212° F.) to the presence of potassium or sodium, introduced by the method usually recommended in manuals of chemistry. By following a method analogous to the production of metallic silicon, titanium is obtained which has no action on water until heated to 500° C. (= 932° F.). The method is a very easy one, and consists in passing the vapor of tetrachloride of titanium through a tube in the middle of which sodium is melted. The mixture of metallic titanium and chloride of sodium is washed with cold water, the powdery titanium is washed with ether, and dried over sulphuric acid. Ch. News, February 11th, 1876, p. 57.

NIOBIUM AND TANTALUM.

Niobium and Tantalum.—A. Joly, referring to the researches of Woehler and Ste. Claire Deville, states that he has found that carbon combines with *niobium*, and that a mixture may thus be obtained containing variable proportions of nitride and carbide, the latter increasing with the temperature. *Titanium* also, like niobium and tantalum, combines with carbon and nitrogen, forming mixtures in various proportions. Ch. N., June 16th, 1876; from Comp. Rend., May 21st, 1876.

Niobates and Tantalates.—A. Joly's researches have confirmed the formulas Nb_2O_5 and Ta_2O_5 for niobic and tantalic acids, which De Marignac had previously determined. These acids are approximate, in their formulas at least, to vanadic acid. Niobic acid in its combination with bases gives rise to four classes of salts—MO,Nb_2O_5; $2MO,Nb_2O_5$; $3MO,Nb_2O_5$; $4MO,Nb_2O_5$. The author gives detailed accounts of the niobates and tantalates of magnesium, and the niobates of calcium, of manganese, of iron, and of yttria. Both acids can be tetrabasic, but they cannot be placed along with the acids of the phosphoric series. Ch. N., September 3d, 1875, p. 113; from Comp. Rend., August 9th, 1875.

TUNGSTEN.

Tungsten.—F. Jean prepares tungsten from the mineral wolfram, by heating the latter in an impalpable powder, and intimately mixed with 3 per cent. of carbonate of calcium and 20 to 30 per cent. of chloride of sodium, in a crucible or reverberatory furnace for half an hour. The cooled mixture is powdered, boiled for a quarter of an hour with hydrochloric acid, which dissolves lime, ferric and manganic oxides, and leaves the tungstic acid in the state of a fine, lemon-yellow, crystalline powder. This is purified by repeated washings with acid, and reduced to the metallic state with hydrogen at a red heat. The author concludes that wolfram is a tungstate of the protoxide of iron and manganese. Ch. N., August 13th, 1875, p. 72; from Comp. Rend., July 12th, 1875.

Prof. J. W. Mallet has observed the following facts in reference to tungsten compounds:

1. Contrary to the statements of some standard chemical works, the precipitate formed by hydrochloric acid in the solutions of an alkaline tungstate can be largely redissolved by an excess of the acid if concentrated.

2. If, in the solution obtained by adding concentrated hydrochloric acid in excess to an alkaline tungstate, small fragments of metallic zinc be one by one dissolved, various colors are successively produced, of which the most noteworthy is a brilliant magenta red.

3. If to the hydrochloric acid solution obtained as above, sulphocyanide of potassium be added, and then metallic zinc in fragments, a deep and rich green color is produced.

4. If to the solution of an alkaline tungstate sulphocyanide of potassium be first added, then a considerable amount of water, then hydrochloric acid, and finally metallic zinc, the liquid assumes a fine amethyst color.

5. The blue color, well known as characteristic of one of the lower oxides of tungsten, may be best brought out by the use of hyposulphurous acid ($H_2SO_2 (O = 16)$) as the reducing agent.

The author details his experiments at some length, since the very striking and brilliant color reactions are producible under certain conditions only, and the most noticeable colors are but transient, the compounds to which they are due being apparently very unstable. J. Chem. Soc., December, 1875, pp. 1228–1233.

MOLYBDENUM.

Molybdic Acid.—Pisani has proposed to determine molybdic acid by reducing it to sesquioxide with zinc and hydrochloric acid, and finding then the amount of permanganate of potassium needful for its reconversion into molybdic acid. A. Wernke finds that the reduction thus obtained is not complete, and sodium amalgam gave also imperfect reduction. Ch. News, Nov. 26th, 1875; Zeitschr. Anal. Chem.

BISMUTHUM.

Bismuth.—The neutral crystallized nitrate of bismuth is recommended by Benoit for determining phosphoric acid by titration (see Phosphoric Acid, in this report). The method may be applied to the determination of bismuth, as follows: A test solution of phosphate of sodium is prepared, of such strength that 50 cubic centimetres shall contain sufficient phosphoric acid to precipitate 0.50 grams of hydrated oxide of bismuth ($Bi_2O_3,3HO$), such a solution being obtained by dissolving 68 grams of pure crystallized phosphate of sodium—free from efflorescence—in sufficient water to make 1000 cubic centimetres. 50 cubic centimetres of this solution is acidulated with 10 drops of nitric acid, heated to boiling, and titrated with a solution of the bismuth salt, prepared as follows: 10 grams of the salt is dissolved in 46 grams of nitric acid, sp. gr. 1.25, and the solution is diluted to 200 cubic centimetres. The quantity of the bismuth solution necessary to complete precipitation of the phosphoric acid represents 0.50 grams of $Bi_2O_3,3HO$. Ph. Centr. H., No. 35, 1875, p. 290.

Subnitrate of Bismuth.—Referring to the process of the B. P.,

L. Siebold suggests some modifications by which a pure product is insured, although at best the product must be variable in its composition. The nitric acid used in the process should be quite pure, for every trace of HCl which it may contain is sure to pass into the precipitate. The solution of the purified bismuth should be diluted with water, then allowed to settle, decanted from the sediment, and evaporated to the point of crystallization. If these crystals be washed with water acidulated with nitric acid, then dissolved in water and the solution poured into the water intended for precipitation, a purer product than that directly produced from the concentrated acid solution of the metal is obtained.

Subcarbonate of Bismuth is usually contaminated by the same impurities as the subnitrate, and may be obtained in a pure state by the same precautions as mentioned in the reference to the subnitrate. It possesses an advantage over the latter in having a more constant composition, and, unless the subnitrate possesses superiority over the subcarbonate from a medicinal point of view, would seem to merit preference.

Oxide of Bismuth.—Unless the subnitrate is boiled for a considerable time with a large excess of solution of soda, its decomposition is incomplete. Moreover, prolonged washing is required to effect the complete removal of the alkali. The author finds that by simple heating the pure subnitrate a product as pure and as soluble in acids as that made by the B. P. process is obtained. Ph. J. Trans., December 4th, 1875, p. 442.

Basic Perchlorate of Bismuth.—M. M. Pattison Muir has obtained a compound corresponding to the formula $Bi(ClO_4)_3,Bi_2O_4$ ($O = 16$), by heating metallic bismuth with an aqueous solution of perchloric acid. Under these conditions a white non-crystalline mass is produced, which, when thoroughly washed with water and dried between folds of blotting-paper, presents the appearance of a bulky pure white powder, which is almost perfectly insoluble in water even at 100° C. (= 212° F.), is readily dissolved by hydrochloric or nitric acids, less readily soluble in sulphuric acid, and decomposed at a red heat with formation of chloride of bismuth. Ch. N., June 14th, 1876, p. 15.

Bismuth Preparations.—Probable Presence of Tellurium.—In a number of cases, in which bismuth compounds had been administered, the patient subsequently suffered from intolerable fetid breath. Charles Ekin, after excluding arsenic compounds as producing this result, attributes it to the presence of tellurium, which is present in some of the bismuth ores in large percentage. It does not appear that the author has actually determined its presence, however. Ph. J. Trans., December 25th, 1876, p. 501.

ARSENICUM.

Arsenic.—A New and Ready Means for its Detection.—E. W. Davy proposes sodium-amalgam for the purpose of generating hydrogen, and employs it as follows: The suspected solution, or the solid matter along with a little water, is placed into a test-glass; a piece of amalgam, about the size of a grain of wheat, is then added, and a piece of white filtering-paper or the cover of a porcelain crucible moistened with a drop of solution of nitrate of silver (slightly acidulated with nitric acid) is immediately placed on the top of the glass, when, if arsenic is present, a dull black or deep brown stain on the paper, or a bright silvery one on the porcelain, will be quickly developed on the part moistened, owing to the reduction of the silver salt by the arseniuretted hydrogen. By this reaction the $\frac{1}{1000}$th part of a grain of arsenic, dissolved in 1 c.c. of distilled water, gives a very decided effect in a few moments, and it is possible to detect the $\frac{1}{100000}$th, and even the $\frac{1}{1000000}$th part. The presence of antimony interferes with this reaction, although not to the same extent as in the known tests dependent on the evolution of arseniuretted hydrogen, since the liquid in which the hydrogen is generated even becomes alkaline, and antimoniuretted hydrogen is not evolved from strong alkaline solutions. It has recently been maintained by Dr. Russel that hydrogen alone is capable of reducing solutions of nitrate of silver to the metallic state; but this action is an exceedingly slow one, and takes place to a very minute extent in dilute solutions. On the other hand, M. H. Pellet maintains that hydrogen carefully freed from acid and arsenic has no action on the silver salt, and this corresponds with the author's experience. The *solution of nitrate of silver* for the test is best made by dissolving 20 grains of the salt in an ounce of distilled water, and acidulating with 2 drops of nitric acid. The *sodium amalgam* is made by heating 8–10 parts of mercury in a test-tube over a lamp, and then adding gradually in small pieces 1 part of metallic sodium, holding the test-tube in such manner that the first portions of the metal, which may be spirted out in an ignited state, shall not be spirted in the operator's face. The presence of arsenic in sodium has not been pointed out; and it is of but rare occurrence in mercury. In the latter event, however, it is readily removed by digesting the mercury in diluted nitric acid, and afterwards washing well with water. Ch. N., Feb. 11th, 1876, p. 58.

Detection in Animal Matter.—Armand Gautier maintains that there are many methods known which serve to demonstrate the presence of arsenic in animal matter, but that none of them can be depended on for its quantitative determination, as they are unable to extract from any tissue the whole of the arsenic which it may have absorbed. He concludes, however, that this may be effected by Marsh's process, if the organic matter is previously dealt with as follows: 100 grams of the suspected substance are cut in pieces, and moderately heated with 30 grams of pure nitric acid in a porcelain capsule of 600 c.c. capacity. The substance liquefies by degrees, then thickens, and acquires an orange tint. The capsule is removed from the fire; 5 grams of pure sulphuric acid is added, whereby the mass is browned, and it is heated until vapors of sulphuric acid begin to escape. 10–20 grams nitric acid are then added drop by drop; the mass again becomes liquid, and an abundance of nitrous fumes are given off. It is then heated to incipient carbonization, the mass is powdered, exhausted with boiling water, filtered; tbe filtrate treated with a few drops of bisulphite of sodium, and the arsenic then thrown down as sulphide by a prolonged current of HS. The sulphide is converted into arsenic acid by ordinary methods, and poured into Marsh's apparatus. Ch. N., Nov. 26th, 1875, p. 259; from Bull. Soc. Chim., Paris, Oct. 5th, 1875.

Detection in Paperhangings.—Kupfferschlaeger communicates the following method for detecting arsenic in wall-paper. The paper is divided into strips, placed on a porcelain soup-plate, covered with a hot saturated solution of chlorate of potassium, heated on a water-bath until completely dry, and set on fire, a bell glass being immediately placed over it so that nothing may be lost. The ash is pulverized, and immediately exhausted in the cold with water which has served to rinse out the bell glass and plate after the combustion. Thus all the arsenic combined with the potash is dissolved out, forming a colorless solution, which is free from any oxides of chrome, copper, aluminium, tin, or lead, if present, and which may be tested at once in a Marsh's apparatus, after having been rendered slightly acid in the usual manner. Ch. N., April 13th, 1876, p. 161.

It has been contended, and especially by Dragendorff, that the quantitative determination of arsenic by means of Marsh's apparatus is inaccurate. Recent experiments of Arm. Gautier seem to prove this view to be incorrect, since by careful and special manipulation he has obtained in the arsenic-ring produced, with the loss of but one decimilligram, all the arsenic that had been used. The conditions necessary to success consist in keeping the apparatus perfectly cold, generating the hydrogen slowly, and in adding the arsenical solution very gradually, thus avoiding completely the formation of sulphurous acid or sulphuretted hydrogen, and consequent loss of arsenic. When the liquid in the hydrogen generator contains but traces of soluble arsenic compounds, the last portions pass off with the hydrogen very slowly. Hence it is not advisable to use sulphuric acid as strongly diluted as recommended by Dragendorff (1 acid to 10 or 12 parts water), but rather that of the strength recommended by the author (1 acid to 2 or 5 parts water). Ph. Centralhalle, No. 50, p. 417, 1875.

ANTIMONIUM.

Pentachloride of Antimony.—F. Kammerer finds that freshly distilled perchloride of antimony, containing a small excess of chlorine, congealed with tolerable rapidity when exposed to a freezing mixture of snow and common salt (—20° C. (= —4° F.)), forming an aggregation of needle-shaped crystals. When removed from the freezing mixture the mass gradually melted, and retained for a considerable period (while a portion was still solid) a temperature of —6° C. (= 21.2° F.), which must be regarded as the melting-point. It appears from these observations that both chlorides of antimony are solids. Ch. C. Bl., No. 26, 1875, p. 403.

Oxychloride of Antimony.—R. W. Emerson Macivor has made the interesting observation that, if the hot, somewhat concentrated, solution of trichloride of antimony is diluted with boiling water until a faint permanent turbidity is produced, and, after the addition of a drop or two of hydrochloric acid to dissolve the turbidity, is allowed to cool, it will become converted into an almost solid mass of amorphous oxychloride, which, on heating to about 100° C. (= 212° F.), redissolves, producing a perfectly clear solution, from which, on cooling, the oxychloride again separates. The precipitate, when dried and digested and washed with bisulphide of carbon, was found to have the composition of Sabanejeff's oxychloride ($2SbCl_3,5Sb_2O_3$). When hot concentrated hydrochloric acid is saturated with antimonious oxychloride, and the solution cooled, an oxychloride containing less chlorine than the original compound is precipitated. Ch. N., November 12th, 1875, p. 229.

Kermes Mineral.—Hermann Weppen has repeated Terreil's experiments upon the formation of kermes mineral (see Proceedings, 1875, p. 306), and finds that author's results with relation to the action of carbonate of potassium, hydrate of barium, and hydrate of strontium to be entirely incorrect, while in the main the reaction of hydrate of calcium is correctly stated. Terreil had maintained that perfectly pure carbonate of potassium was incapable of producing kermes when boiled with sulphide of antimony, and that in all cases where such was produced it was due to the presence of carbonate of sodium. Operating with pure carbonate of potassium prepared from the ordinary carbonate, from cream of tartar, and by the method of Terreil from purified sulphate by means of carbonate of barium, Weppen obtained in each instance an abundance of kermes mineral. It does not yield, however, quite as abundantly as does carbonate of sodium, owing to the circumstance that the sulpho-compound of the antimony and potassium has the power to retain a larger proportion of kermes in solution.

Regarding the action of the hydrates of barium and strontium, Weppen has found, in contradiction to Terreil's results, that the former yields an abundance of kermes, while the strontium compound also yields such, but much more sparingly. With hydrate of calcium he obtained an immediate and abundant precipitate of dark-brown kermes, while Terreil observed a sparing immediate chrome-yellow deposit, and that the sulpho-salt was decomposed but gradually by the agency of the air and carbonic acid.

It follows from Weppen's experiments and results that the *supposed* difference in the reaction of carbonate of sodium and carbonate of potassium with solutions of sulphide of antimony, cannot be made available for the detection of soda in admixture with potassa, as was so confidently expected by Terreil. Arch. Ph., August, 1875, p. 130.

HYDRARGYRUM.

Calomel.—Manufacture in China and Japan. Dr. Geerts states that calomel has been known to the Chinese long before it became known in Europe, and that in Japan it was first prepared in the year 741, in the province of Isé; hence the name *Isé-oshirir* (cosmetic of Isé), as it is sometimes called, its more common name being *Kei-fun* (light powder). The Chinese or Japanese calomel occurs, according to its quality, in fine, brilliant, transparent, flat crystalline plates, or as a crystalline powder. Although pure when properly made, it is often, in fact nearly always, adulterated with variable quantities of small crystalline gypsum (*selenite*), or with powdered mica, or with both of these substances. It is prepared to some extent in Japan (Isé, Osaka), but is also imported to a considerable extent by the Chinese merchants of Osaka. It is partly prepared by methods which are kept secret, but also by the following formula of the large Chinese Materia Medica:

Two parts of alum, one part of mercury, and one part of common salt are mixed in a mortar with a little water until a very accurate mixture is obtained, in which no globules of mercury can be perceived. After being dried this mass is placed in an iron bowl, which is closed with a covering of earthenware, carefully luted with a mixture of loam, ashes, and salt. The whole is then carefully heated on a charcoal fire, and the covering plate in the meantime cooled with wet cloths. The calomel sublimes within four or five hours on the inner side of the cover as a porous, light, crystalline powder. The more the sublimate has a light, soft, and porous appearance, the more it is esteemed. If the calomel thus obtained has undergone a second or third sublimation it is thought to be much better; forms soft, small, tubular crystals, and is known as *Fun-sô*. *Kei-fun* is found in every Japanese drug shop, packed in oblong square wooden boxes or black shining paper, and is a medicine which is extensively used. Foreign-made calomel has become more and more popular, and is distinguished by the Japanese by the name *Karomera* or *Kan-ko*. Drug. and Chem., February, 1876, p. 50.

Action of Bromides.—Norman A. Kuhn has made some experiments upon the action of bromides (of potassium, sodium, or ammonium) upon calomel in the presence of water, and finds that in all cases a portion of the calomel is converted into mercuric salt, another portion being reduced to the metallic state. He judges the reaction to be as follows:

$$\underset{\substack{\text{Mercurous}\\\text{Chloride.}}}{Hg_2Cl_2} + \underset{\substack{\text{Potassium}\\\text{Bromide.}}}{2KBr} = \underset{\text{Mercury.}}{Hg} + \underset{\substack{\text{Mercuric}\\\text{Bromide.}}}{HgBr_2} + \underset{\substack{\text{Potassium}\\\text{Chloride.}}}{2KCl.}$$

Dr. Circ., June, 1876, p. 103.

White Precipitate.—Reaction with iodine in presence of alcohol. V. Schwarzenbach had formerly stated that when iodine and white precipitate (amido-chloride of mercury) are mixed together, no marked reaction occurs, except the formation of magnificent crystals of biniodide of mercury; the latter especially when the intimate mixture is heated in a crucible. If, however, alcohol is poured upon the mixture, which may be intimate or a loose mixture of crystals of iodine and lumps of white precipitate, reaction occurs in a short time, and very soon a violent explosion results. It seems that alcohol is an important factor in this reaction, since by the substitution of bisulphide of carbon, propylic alcohol, amylic alcohol, chloroform, or glycerin for ethylic alcohol, no explosive action occurred, even after standing 24 hours. Ph. Cent. Halle, Jan. 1st, 1876, p. 2.

In referrence to this same subject, Prof. Flückiger observes that the incorporation of iodine with the molecule of white precipitate can proceed entirely without the interposition of a solution. If, for instance, three molecules of white precipitate are mixed with four molecules of iodine and rubbed together vigorously, scarcely any change takes place; but if the powder be allowed to stand quietly it puffs up after a short time, that is, within a quarter of an hour or longer, according to the quantity of the mixture, the form of the vessel, the treatment, and the temperature. Without doubt this puffing, which is not particularly vigorous—at any rate not attended by explosion—is due to the formation and breaking up of iodide of nitrogen or iodamine. It is remarkable that this decomposition takes place suddenly, without any exterior cause, and without danger, especially when the experiment is made with only a few grams. The author further finds that the decomposition of white precipitate by iodine can be very conveniently carried out by regulating it through the addition of water; the reaction beginning at once if the powder in the above proportions is moistened with water. Ph. J. Trans., March 18th, 1876, p. 743; from Ber. d. d. Ch. Ges.

Cinnabar.—F. Gramp recommends for its quantitative analysis that the sulphur be determined as sulphuric acid. Its oxidation is readily effected by heating the cinnabar in a sealed tube for two hours with nitric acid of sp. gr. 1.4, at a temperature of 120° C. (= 248° F.). The sulphuric acid is then determined as sulphate of barium. Arch. Ph., Oct., 1875, p. 371.

Hydrargyrum Iodidum Rubrum.—Charles L. Mitchell proposes nitrate of mercury as a substitute for corrosive sublimate in the preparation of this compound, whereby the difficulties occasioned by the sparing solubility of the latter are entirely overcome. 1000 grains of mercury are dissolved in 1700 grams of nitric acid (sp. gr. 1.42) (?) by the aid of gentle heat; the solution is diluted with its volume of water, and precipitated with a solution of 1662 grains (or q. s.) of iodide of potassium in 8 fluid ounces (or q. s.) of water, until no further precipitation occurs, care being taken to avoid an excess of the latter. The precipitate is then washed, collected, and dried as usual.

Hydrargyrum Oxidum Flav. is likewise recommended to be prepared from the acid nitrate (the officinal solution answering for both this and the iodide); and solution of soda is recommended by the author, in place of solution of potassa, on account of its cheapness. A. J. Ph., March, 1876, p. 115.

Mercuric Iodate.—C. A. Cameron finds that the statements made by Rammelsburg and Pleischl, that mercuric iodate cannot be obtained by precipitation, is erroneous, except in reference to mercuric chloride; iodic acid added to a hot solution of oxycyanide of mercury, in the ratio indicated by the equation:

$$(HgCy_2 + HgO) + 2HIO_3 = Hg2IO_3 + HgCy_2 + H_2O \ (O = 16)$$

gives a white amorphous precipitate, almost insoluble in water, attacked with difficulty by nitric acid, but readily soluble in hydrochloric acid. Iodic acid and alkaline iodates give the same kind of precipitate with nitrate and acetate, but not with chloride of dyad mercury. However obtained, mercuric iodate dissolves very readily in alkaline chlorides, bromides, iodides, cyanides, and cyanates, in hyposulphite of sodium, and in hydrochloric acid; also in dilute solutions of the chlorides of zinc and manganese. It is insoluble in solution of potassa, soda, ammonia, sulphite of sodium, borax, corrosive sublimate, phosphate of sodium, alkaline iodates, chlorates, and bromates, and in acetic, fluoric, and silico-fluoric acids. Treated with hydriodic acid or hydrobromic acid, it is dissolved with liberation of bromine and iodine. For some further reactions and properties, see Ch. N., June 23d, 1876, p. 253.

ARGENTUM.

Silver.—Presence of Selenium.—H. Debray states that silver, even containing 99.8 to 99.9 per cent. of pure metal, is sometimes found to contain traces of selenium. In this condition it is not adapted for the preparation of industrial alloys, and refiners should therefore be careful to employ only such sulphuric acid as is free from selenium. The impurity may be eliminated by melting the silver, as precipitated by copper, along with nitrate of potassium or sodium. Ch. N., June 9th, 1876, p. 241; from Compt. Rend., May 15th, 1876.

Nitrate of Silver.—Action of Sulphide of Sodium.—Vidau finds that if to a given quantity of standard solution of nitrate of silver, such a quantity of cyanide of potassium be added as will exactly redissolve the cyanide of silver formed, and to that liquid standard solution of sulphide of sodium be added, it will be found that the theoretically equivalent quantity of this reagent will not be sufficient for the complete precipitation of the silver, and that if a slight excess of the sulphide be added, and the solution filtered, the filtrate, although perfectly limpid, will, to a test-paper prepared with nitroprunide of sodium, indicate the presence of free sulphide of sodium, and will also, on the addition of more sulphide, show the presence of silver by the occurrence of a black precipitate of sulphide of silver. A considerable excess of sulphide of sodium is necessary to completely precipitate all the silver. A possible explanation is that the sulphide of silver is slightly soluble in the cyanide of potassium, and that the excess of sulphide is requisite to cause the disturbance of that equilibrium. Jour. Ch. Soc., May, 1876, p. 747; from J. Pharm. Chim.

Removal of Silver Stains from Clothes.—A method for the removal of silver stains, which succeeds best upon goods which have been washed several times, is given in Phot. Arch. (16.175), as follows: The stained part is immersed in a solution of chloride of copper for a few minutes, the length of time being dependent on the intensity of the stain. The stain is then rubbed with a crystal of hyposulphite of sodium, which has been dipped into a mixture of equal parts of water and liquor ammoniæ. The process is repeated if necessary, and if a neutral solution of copper has been employed, the color of the goods is not changed in the least. Ch. C. Bl., No. 48, 1875, p. 768.

THALLIUM.

Thallium, which in its properties is most closely related to lead, possesses similar poisonous action, but such is much more violent and rapid. Rabuteau places it among the muscular poisons, and finds it in that character to agree with that theory, according to which the poisonous qualities of metals are increased in proportion to the increase of their atomic weight. Zeitschr. Oest. Ap. Ver., No. 21, 1875, p. 345.

J. Krause pursues the following improved method for the preparation of thallium from flue-dust, which recommends itself for its simplicity and inexpensiveness. Three large spirit-barrels, planed perfectly smooth inside, are so arranged that the liquid in the upper barrel may be completely drawn by a siphon into the one next beneath. In the upper barrel the flue-dust is exhausted with water heated by the aid of steam, the clear liquid is drawn off into the second barrel, and in this is treated with hydrochloric acid, which decomposes the sulphate of thallium and precipitates chloride of thallium; the latter settling, if stirred vigorously, as readily as does chloride of silver. The clear liquor is now drawn off, the barrel filled with pure water, heated with steam, and so much crystallized sulphate of sodium added that it acquires a gravity of 5° B. The mixture is now stirred vigorously, and very soon complete transformation into sulphate of thallium results. The clear liquid is now drawn into the third barrel, is acidulated slightly with sulphuric acid, and decomposed by pure metallic zinc. The spongy thallium formed is washed with pure water, freed from air, strongly pressed to remove the water, and then melted. Obviously the process may be made continuous. The washings from the flue-dust (in the upper barrel) are profitably used in exhausting a fresh portion of the dust. Ch. C. Bl., 41, 1875, p. 643; Polyt. Jour., 217, 323.

R. Neitzki finds that the precipitation of thallium as chloride from the aqueous extraction of flue-dust is incomplete, as much as 10 per cent. of the quantity contained in it remaining in solution. He proposes, therefore, to precipitate the filtrate from which the chloride has been precipitated, by means of iodide of potassium, which precipitates nearly all of the thallium remaining. The washed precipitate is boiled with sulphide of sodium, whereby iodide of sodium and insoluble sulphide of thallium are formed. The latter is converted into sulphate by treatment with dilute sulphuric acid. The reduction of sulphate of thallium to the metallic state, which is usually accomplished by means of zinc, is better conducted by the galvanic current of an ordinary galvanoplastic apparatus, since by the use of zinc impurities may be introduced into the metal. The reduction is rapid, and the thallium is obtained as handsome crystalline leaves. These are formed into a compact lump, introduced firmly into an iron crucible, and fused to a regulus in a current of hydrogen. Or in place of the current of hydrogen, a little oxalic acid is placed on the lump of thallium, when, upon melting, a regulus is readily formed. The very sparing solubility of the iodide may be advantageously applied to the titration of salts of thallium, and is preferable to the method proposed by Fresenius, by means of permanganate of potassium; the latter being, moreover, inadmissible in presence of proto salts of iron or of sulphites. The limit of error, caused by the very trifling solubility of the iodide, is very small indeed. Arch. Pharm., Nov. 1875, p. 385.

Chlorate of Thallium.—John Muir obtains this salt readily by double decomposition with equivalents of sulphate of thallium and chlorate of barium. It forms white and almost opaque microscopic crystals, which are perfectly permanent in the air, readily soluble in hot water, without decomposition, and sparingly soluble in cold water. The author has not succeeded to obtain the salt in a fit state for crystallographic examination. Jour. Chem. Soc., June, 1876, p. 857.

AURUM.

Gold.—Sergius Kern finds sulphocyanide of potassium a very delicate reagent for gold. The gold of the sample is separated from foreign metals, converted into sodio-gold chloride, and the solution concentrated. A drop of the solution, when poured into a large excess of a solution of sulphocyanide of potassium, gives a red orange turbidity, which, the author states, is observable with less than 0.001 gram, although the experiment, as described, does not seem to prove this. Ch. N., October 8th, 1875, p. 171.

Method of Gilding.—Boutet de Monvel gives the following: Dissolve 1 gram of fine gold in aqua regia, evaporate the solution till it is of the color of ox blood, add a half litre of hot distilled water in which has been dissolved 4 grams of white cyanide of potassium, stir, and filter. To gild with this liquid, it is heated a little above lukewarm, and the articles to be gilt are immersed in it and supported upon a piece of very clean zinc. Ch. N., July 16th, 1875, p. 30.

PLATINUM.

Platinum.—Specific Gravity.—Pure platinum was, by H. Saint Claire Deville and H. Debray, found to have the sp. gr. 21.504; an alloy of 90 platinum and 10 iridium, 21.615; another of 85 platinum and 15 iridium, 21.618; 66.67 platinum and 33.3 iridium, 21.874; 5 platinum and 95 iridium, 22.384. *Iridium* was found to have a sp. gr. of 22.421. All of the above alloys showed contraction. The sp. gr. of both platinum and iridium are higher than have hitherto been found. Ch. N., December 10th, 1875; from Compt. Rend., November 15th, 1875.

Platinum Black.—Zdrawkowitsch obtains very energetic platinum black by adding gradually solution of chloride of platinum to a boiling mixture of 15 cubic centimetres of glycerin and 10 cubic centimetres of solution of potassa, sp. gr. 1.08. Professor Böttger states, in this connection, that very active platinum black may be obtained by heating a solution of chloride of platinum with solution of caustic soda and glucose. Ph. Centr. Halle, No. 21, 1876, p. 179.

Platinum Compound with Tin and Oxygen.—B. Delachanal and A. Mermet have obtained a platinum compound analogous to "Purple of Cassius," by mixing solutions of bichloride of platinum and protochloride of tin, diluting with water, and heating to boiling. A brown compound is deposited, which, after long-continued washing with water, becomes completely freed from chlorine, and is then composed of oxygen, tin, and platinum only. It is, like the corresponding gold compound, a hydrate, and loses its water of hydration when heated to 100° C. (= 212° F.), while at a red heat it seems to lose oxygen. It dissolves in molten glass and imparts to it a gray color, is affected by boiling alkalies or aqua regia, and appears under the microscope to be composed of amorphous, translucent yellow grains. Comp. Rend., 81, p. 370; Ch. C. Bl., No. 40, 1875, p. 625.

PALLADIUM.

Sulphocyanide of Palladium.—Sergius Kern finds that when solutions of chloride or nitrate of palladium are mixed with alkaline sulphocyanides a soluble sulphocyanide of palladium is formed, which communicates to the solution a reddish-brown color, which turns red. The sulphocyanide of palladium is a very stable compound, in which the presence of palladium is not easily detected, and, since it does not give a black precipitate in an alcoholic solution of iodine, the palladium test for iodine, in presence of sulphocyanides, is liable to lead to faulty results. Ch. News, November 19th, 1875, p. 242.

OSMIUM.

Osmium.—As obtained by Saint Claire Deville and H. Debray, this metal has a fine blue color, shaded with gray. It forms small crystals, either cubic or rhombohedric, closely bordering on the cubic form. It is harder than glass, which it scratches with ease. It is the heaviest body known, its sp. gr. being 22.477. Crystalline osmium is obtained by passing the vapor of osmic acid, repeatedly rectified, over pure carbon. The sesquioxide of osmium is frequently deposited in the tube in crystalline scales of a fine coppery red color, permanent in air, and composed of 89.13 per cent. osmium and 10.87 per cent. oxygen. Ch. N., June 2d, 1876, p. 230; from Compt. Rend., May 8th, 1876.

ORGANIC CHEMISTRY.

HYDROCARBONS.

Nitrobenzol.—The extended application of nitrobenzol, under the commercial designation *oil of mirbane*, as a substitute and adulterant for oil of bitter almonds, has led E. Jacquemin to offer some experiments for its detection. Since nitrobenzol possesses, undoubtedly, poisonous properties, it becomes important that a method for its

Toxicological Determination should be more generally known. For this purpose the substance, suspected to contain nitrobenzol, is distilled with dilute sulphuric acid. The nitrobenzol collects on the surface of the distillate, from which it is removed by agitation with ether, and evaporation of the ethereal solution. The product so obtained is tested for prussic acid, for which purpose Schönbein's method (tincture of guaiac) will answer. If a blue color is produced, oil of bitter almonds possibly adulterated by nitrobenzol is indicated. If no change takes place nitrobenzol is indicated, and proved by converting it into anilin, and subjecting the anilina to several color tests. For this purpose 1 drop of nitrobenzol is dissolved in 20 c.c. of alcohol of 45 to 50 per cent., the solution is agitated with zinc clippings and sulphuric acid, and the acid solution of anilin so obtained is divided into three portions. One portion is supersaturated with carbonate of sodium, filtered, and a drop of carbolic acid, followed by hypochlorite of sodium, added; a brown color is produced, which rapidly changes to blue. To another portion a small quantity of peroxide of lead is added. In the presence of the free sulphuric acid the peroxide of lead oxidizes the anilina, the solution acquiring a rose-red color, which changes to brown, and finally to greenish-blue or violet-blue. To the third portion of the liquid a crystal of chlorate of potassium is added, and concentrated sulphuric acid is allowed to flow down the side of the test-tube; a handsome violet coloration is now produced. Instead of using zinc and sulphuric (or hydrochloric) acid for the reduction of nitrobenzol to anilina, the author recommends also a

New Method for the Reduction of Nitrobenzol, which is based upon the facility with which alkaline solutions of protoxide of tin pass to the state of binoxide, simple boiling effecting this conversion. If nitrobenzol is added to a solution of protoxide of tin in soda, and subjected to distillation, anilina distils over, the reaction taking place according to the following equation:

$$C_{12}H_5NO_4,2HO,6(2NaO + SnO) = C_{12}H_7N,6(2NaO + SnO_2).$$

Practically the method is applied as follows: Protochloride of tin is treated with solution of caustic soda until the precipitated protoxide of tin is redissolved, a few drops of nitrobenzol are then added, and the mixture is heated for two minutes. The solution is then allowed to cool, a few drops of carbolic acid, followed by chlorinated lime, are added, when the blue color of erythrophenate of sodium will appear. The chlorinated lime must be added in somewhat larger quantity than with pure anilina, because a portion of it is necessary to oxidize some protoxide of tin remaining unchanged. The author's methods, as above given, serve for the detection of nitrobenzol in oil of bitter almonds, etc., better than the methods usually employed. Arch. Ph., February, 1876, p. 146; from J. de Ph. et de Chim., 1875.

Cymen.—Identity as obtained from Various Sources.—G. H. Beckett and C. R. Alder Wright have made a series of comprehensive experiments by which they arrive at the conclusion that, by the action of a large number of agents on terpens and bodies related to them, absolutely the same cymen results, this cymen being identical with the *paramethylpropyl benzene* recently obtained synthetically by Fittier by acting with sodium on a mixture of normal propylbromide and solid parabromotoluen melting at 29° C. (= 84.2° F.). From cymens obtained from the hydrocarbons of oils of orange-peel, nutmeg, and cajuput, from citronellol, myristicol, and absinthol (oxidized constituents of citronella oil, nutmeg oil, and wormwood oil), and from menthene, the authors obtained toluic acid, which corresponded very well in the melting-points and analytical numbers obtained.

The cymen from menthene was obtained by the authors for the first time from *crystallized Japanese oil of camphor*. The menthene was prepared from the latter by heating the crystals with about their own weight of chloride of zinc, distilling, separating the watery portion of the distillate, and distilling the oily portion with cohobation over sodium. The menthene so obtained, boiled between 164.5° and 165.5° C. (= 328.1° and 329.9° F.), and gave upon analysis numbers corresponding to $C_{10}H_{18}$ (O = 16). The product was converted into tetrabromide of menthene, which upon heating readily splits up into cymen and hydrobromic acid, according to the following equation:

$$C_{10}H_{18}Br_4 = 4HBr + C_{10}H_{14} \ (O = 16).$$

In order to see if polymerides of terpens of the $C_{15}H_{24}$ (O = 16) series are capable of giving rise to cymen, the authors experimented with a specimen of the *hydrocarbon contained in clove oil*, which clearly belongs to that series of hydrocarbons. The result was in the negative, not a trace of cymen being obtainable. The authors likewise experimented with *liquid oil from camphor sublimation*, from which they obtained but about 1 per cent. of cymen. *Liquid oil of camphor* is evidently a complex mixture, probably containing a hydrocarbon of the terpen series, a body having the composition of the hydrate of terpen, and a liquid oil containing less hydrogen than camphor, together with much ordinary camphor. J. Chem. Soc., January, 1876, pp. 1–8.

Naphthalen.—Solubility in Water.—It is generally stated that naphthalen is insoluble in cold water and but slightly soluble at the boiling-point. S. Lupton boiled some naphthalen, purified by resublimation through filtering-paper, for some time in water. On evaporating the cooled liquid on a water-bath no residue was left, but this is evidently due to the volatility of naphthalen in steam, since the boiling-point of the liquid was ascertained to be 103° C. (= 217.8° F.), both in the presence and absence of a piece of clean platinum wire. The author infers that naphthalen is slightly soluble in cold water. Ch. N., March 3d, 1876, p. 90.

Paraffin.—B. F. Stacey read a paper on paraffin, giving its history, method of manufacture, properties, use in pharmacy and the arts, and its importance as a commercial article.

Joseph L. Lemberger read a paper on

Paraffin Oil, mainly with a view of producing a permanent base for ointments and cerates; the addition of pure beeswax masks its odor entirely, or very nearly. Proceedings, 1875.

Vaseline.—J. Moss and A. W. Gerrard have communicated two papers to the Pharmaceutical Society of Great Britain, in which they speak very highly of the pharmaceutical value of "vaseline." The subject gave rise to considerable discussion, in which Messrs. Martindale, Gale, Professor Redwood, Professor Attfield, and others participated, and from which it appears that vaseline is superior to all other materials usually employed as basis for ointments, pomades, etc., and that this superiority is owing to its permanent character. Mr. Moss expresses the opinion that, the manufacturer making no secret of the origin and method of preparing this substance, it cannot be viewed in the light of a nostrum; that there appears no reason why it should not be used if it possesses the advantages claimed for it over lard, simple cerate, etc., and if the price suits; and that a thorough understanding of its composition should be sought. (Dr. A. W. Miller's experiments upon the production of a *substitute* for cosmoline are referred to, but very little weight seems to be placed upon that gentleman's efforts to combat what, from the acknowledged value of unchangeable substitutes for lard and other fats in ointments, must eventually become a monopoly in the hands of a few, and consequently a burden to the entire profession. While, therefore, it is desirable that the exact nature of vaseline (and cosmoline) should be studied and determined, it is equally desirable that some substitute should be furnished to the profession, which, equal in all other respects, may be produced on a small or large scale by any person who may desire to make it. In fine, it is desirable, and even necessary, that a substitute for lard, tallow, wax, etc., should be as accessible to the pharmacist as are these ordinary products. C. L. D.)

Valerylene.—By acting upon valerylene with hypochlorous acid P. Haubst obtained a new body of composition corresponding to the formula $C_4H_7ClO_2$, and consequently empirically of the same composition of monochlor-butyric acid. Its sp. gr. at 15° C. (= 59° F.) is 1.065; it possesses a strong acid character, and reduces silver salts to metallic silver. It has a highly penetrating odor, burns with a green-edged flame, affords a clear solution in ammonia water, and forms compounds with this, as well as with barium, calcium, and lead; does not seem to form distinctly characterized salts. Ch. N., November 26th, 1875, p. 252.

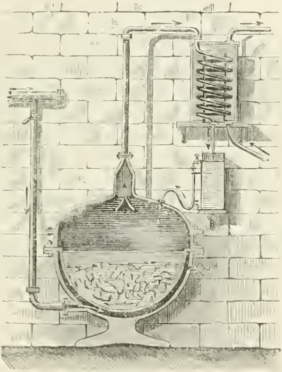
Reten.—In working up the products of the dry distillation of wood, a residue is left which finds application as lubricating oil. This contains an abundance of reten, which, according to A. G. Ekstrand, may be separated by subjecting the strongly-cooled mass to expression and washing the impure mass with ether, by which nearly all the impurities are dissolved and nearly pure reten is left. By recrystallization the reten is obtained perfectly pure, and then forms white leaflets, which melt at 98.5° C. (= 209.3° F.), and solidify to a crystalline mass at 90° C. (= 194° F.). It is readily dissolved by ligroïn, bisulphide of carbon, benzin, and ether; sparingly soluble in cold alcohol or glacial acetic acid, but freely dissolved by these at a boiling temperature. It is completely insoluble in water, possesses neither odor nor taste, combines readily at the ordinary temperature with chlorine and bromine, and produces additional products which, at a higher temperature, are decomposed, with formation of substitution compounds, some of which are described in the author's paper. Ch. C. Bl., No. 40, 1875, p. 628; Compt. Rend., 81, p. 100.

VOLATILE OILS, ETC.

Volatile Oils.—G. Dubelle has communicated an interesting paper on volatile oils, their composition, and especially their adulterations, to "Druggists' Circular," May, 1876 (p. 86). The paper will be read with profit, but is unsuited for abstraction.

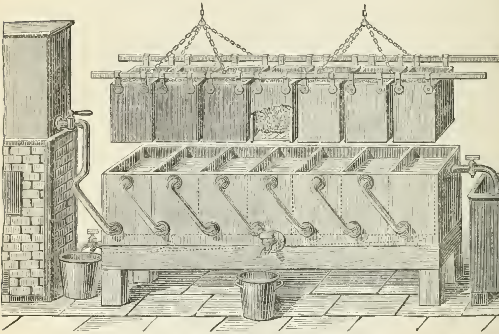
Volatile Oils.—Preparation.—P. Perrenoud communicates a paper on the various methods employed for the production of volatile oils, including those which can be extracted only by infusion or absorption (enfleurage). The ordinary process of extraction by *distillation* is well known; on a large scale a still provided with a steam jacket is employed (see Fig. 32), into which the substance is placed along with water, and distilled with steam under pressure. The main portions of the still are sufficiently familiar to be readily understood; but the receiver immediately beneath the worm cooler requires explanation. In this receiver the oil collects, and is so arranged that, by uniting the stop-cock on the upper or lower part of the receptacle with an S tube, communicating with the still, the watery portion of the distillate returns to the still, while the oil collects on the surface of the watery distillate, or sinks to the bottom, as the case may be, and is drawn off from time to time by the stop-cock not united to the still. This method of extracting the volatile oil is applied only to those substances that are rich in oil, or from which the oil may be separated by distilling fresh portions successively with the same distillate. Instead of cohobating, the oil is sometimes separated from its aqueous solution by agitation with ether, and evaporation of the ethereal solution. A second method of obtaining volatile oils is by *expression*, the process being applicable, however, to a few substances only, which are very rich in oil. The various methods of expression pursued are well described in Flückiger & Hanbury's "Pharmacographia," page 106. One of the oldest methods, and one that is still pursued to some extent, consists in spirting the oil contained in the rind of certain fruits—oranges, lemons, bergamot, etc.—upon a sponge, by bending the rind with pressure. The oil is then expressed from the sponge, is allowed to settle, and decanted. A more profitable expression is accomplished, in the south of France, by rubbing the fruit upon a contrivance con-

FIG. 32.



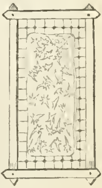
sisting of an ordinary pewter plate, which is provided with numerous brass points, about one half inch in length. The oil collects in a closed tube attached to the bottom of the plate. In Italy a specially constructed grater is used, in recent times, for the extraction of the oil of bergamot; one apparatus being capable of grating 7000 fruits in a day. After the grating process the fruit is peeled, and the last traces of oil are obtained from these peelings by distillation, furnishing an inferior grade of oil.

Fig. 33.



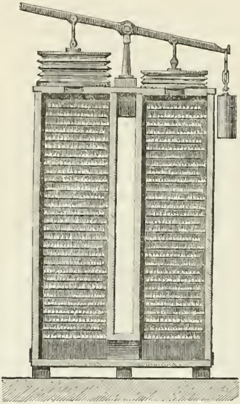
The extraction of volatile oils by *infusion* is resorted to when they are contained in very minute quantities or when they are injured by distillation. This process consists in macerating the substance (flowers, leaves, etc.) in oil, or a mixture of tallow and lard, heated to about 65° C. (= 149° F.), in an apparatus which is illustrated by Fig. 33. The kettle to the left supplies the fat, heated to the proper temperature, which circulates slowly through the macerating tank, in which a constant temperature of 65° C. (= 149° F.) is maintained by means of a steam pipe. This macerating tank is divided into compartments, in which baskets, containing the vegetable substance to be extracted, are suspended. The basket on the left contains the substance which has passed through all the compartments; it is removed from time to time, filled with fresh substance, and then attached to the right, the other baskets being moved to the next compartment to the left. In this way the fresh substance has to traverse each compartment from right to left, while the fat flows slowly from left to right, and saturated with the perfume of the substance, collects in the tank on the extreme right. Latterly paraffin has been used instead of the ordinary fats, for this purpose, and solid blocks of perfumed paraffin occur in commerce. The most delicate odors, however,. are extracted by *absorption* (enfleurage). The older method, and one which is still pursued to a great extent, notwithstanding its faults, consisted in covering glass trays (Fig. 34; frames) with fat, and covering this with the flowers; replacing the exhausted flowers by fresh ones every forty-eight hours. A better method is that in which the flowers and fat are placed upon separate trays in a chamber arranged as illustrated by Fig. 35. This is provided with bellows, and being air-tight, the air within the chamber is caused to circulate to and fro by the working of the bellows, whereby the fat is caused to absorb the odor of the flowers very rapidly and is less liable to rancidity. From the perfumed fats, whether made by infusion or absorption, the odor is extracted by means of alcohol, and the alcoholic solution is exposed to a freezing mixture, 15° to 20° C. (= 5° to 40° F.), in order to precipitate the small quantity of fixed oil dissolved, and filtered cold. Finally, the method of *displacement*, with ether, chloroform, or bisulphide of carbon, is applied to flowers occasionally. Extracts of a butter-like consistence are obtained, which are washed with weak alkaline water, and dried in a current of dry air; they are valued highly. Schweiz. Wochenschr., No. 15, 1876, p. 119.

Fig. 34.



Determination of Volatile Oils in Plants.—O. Osse proposes the following method, which recommends itself for its simplicity and practicability: Five grams of the finely powdered substance is shaken with 25 c.c. of petroleum ether (boiling-point not exceeding 40° C. (= 104° F.)) for several hours; it is then allowed to subside; 1 c.c. of the clear liquid is drawn off, evaporated on a watch-glass in a current of dry air until the odor of the ether is no longer perceptible. The beaker with contents is then weighed, the volatile oil is driven off at a temperature of 110° C. (= 230° F.), and again weighed. The difference of the two weighings indicates the quantity of the volatile oil. When the volatile oil is associated with a large quantity of fixed oil, a correction must be made for a very slight increase in weight, resulting from the heating of the fixed oil in air. For non-drying oils 0.09 per cent. of the weight of the *fixed oil* found is added to the weight of the volatile oil as above obtained. By this method the author has ascertained the following percentages of volatile oil, and resin or fixed oil, in the substance named:

Fig. 35.



	Volatile Oil.	Resin, or Fixed Oil.
Buchu leaves,	1 75 per cent.	2.25 per cent.
Laurel berries,	13.25 "	25.00 "
Cascarilla bark,	2.50 "	4.50 "
Star anise,	13.00 "	13 50 "
Cloves,	24.75 "	1.75 "
Calamus root,	3.90 "	0.75 "
Wormseed (?),	2.25 "	3.00 "

Zeitschr. Oest. Ap. Ver., No. 27, 1875, p. 441.

On page 320 of the Proceedings for 1873, reference is made to a method proposed by Prof. G. Dragendorff for the detection of adulteration of volatile oils, which method is based upon the difference of their solubility in alcohol more or less diluted with water. This paper is now supplemented by a series of papers, in which he relates his more recent results on the same subject. These embrace:

1. A series of oils, which, not being authentic specimens, the author did not deal with in his former communication.

2. A discussion of the question how far the solubility of essential oils in alcohol becomes altered by keeping, and how far this occurs when the essential oil has been freed from resinous substances by redistillation.

3. The demonstration of the fact that in many cases the oils met with at present in commerce do not agree with those prepared by the author.

4. The detection of essential oils in drugs, medicinal mixtures, and for the purposes of judicial investigation.

The papers are entirely too voluminous for extraction, and the reader is, therefore, referred to the originals in Ph. J. Trans., Jan. 8th and 22d, Feb. 12th, 26th, and March 11th, 1876.

Action of Chloral.—O. J. Ommen has observed, that the color reaction of chloral with oil of peppermint may also be produced with other oils by the aid of mineral acids. The coloration is produced by adding a little of the oil to a very concentrated aqueous solution of chloral, and stirring the mixture with a glass rod moistened with the acid. The coloration produced in this manner is yellowish to red-brown, and many of the oils are not at all affected. The author is of opinion that it is the hydrochloric acid produced from chloral that produces this reaction, and experiments made in this direction prove that a much larger percentage of oils are affected by the addition of a few drops of that acid, very few oils remaining colorless. Most of them assume a violet-brown to dark-green color. Ph. C. Halle, Jan. 1st, 1876, p. 1.

Oil of Turpentine.—A case of spontaneous combustion, induced by spilling a small quantity of oil of turpentine on a barrel containing chlorinated lime, is recorded in "Droguisten Zeitung." About 50–100 grams of the oil had been spilled upon the top of the barrel, when, in the course of an hour, a very penetrating odor having become evident, the barrel was opened, and the chlorinated lime was found to be red-hot to the depth of about 15 cm. The cause of this is, probably, to be looked for in the strong affinity of the chlorine for the hydrogen of the terpen. Ph. Centralhalle, No. 27, 1875, p. 225.

Oil of Peppermint.—Roucher has found that when ordinary glacial acetic acid is mixed with about 5 per cent. of oil of peppermint, and is then allowed to stand, the mixture assumes a blue color after an hour, and then gradually becomes darker and dichromatic, appearing deep blue by transmitted, and vermilion red by reflected light. Upon the addition of water a blue substance is precipitated, which collected upon a filter, rapidly turns red, and then becomes gradually colorless. In the original solution the color gradually changes to green and, finally, yellow.

Dr. Hager, repeating some of the author's experiments, has found that the change is not as rapid as indicated. In two experiments a faint blue color was produced after standing 4–7 hours, and the dark blue color and dichroism did not appear until after 2 days, and, with an old sample of oil, not until after 3 days' standing. Fresh oil produces with glacial acetic acid an opalescent mixture, whilst old oil dissolves perfectly clear. This behavior seems to point out a ready method of distinguishing old from fresh oil of peppermint. Ph. Cent. Halle, No. 43, 1875, p. 362.

Oil of Cubebs.—A. Oglialoro obtained from 50 kilograms of cubebs, by distillation with a current of steam, about 2 litres of crude oil, which by rectification and fractional distillation yielded,

1. A terben $C_{10}H_{16}$ ($O = 16$), boiling at 158–163° C. (= 316.4–325.4° F.), which possesses a deflection of 35.5° to the left.

2. A sesquiterben $C_{15}H_{24}$ ($O = 16$), boiling at 264–265° C. (= 327.2–329° F.), which deflects to the left (44.3°), has a specific gravity of 0.9289, and forms a handsomely crystallizing hydrochlorate, which has the composition $C_{15}H_{24}2HCl$ ($O = 16$), melts at 118° C. (= 244.4° F.), and yields the terpen unchanged, when heated with water to 170–180° C. (= 338–356° F.).

3. A hydrocarbon boiling at 262–263° C. (= 323.6–325.4° F.), which has a much lower rotating power than the above-mentioned terpens. Its composition could not be determined, since it does not combine with hydrochloric acid, and could not, therefore, be obtained entirely pure. Its composition possibly corresponds to that of the sesquiterben. Ch. C. B., No. 49, 1875, p. 776; from Ber. Chem. Ges., 8, 1357.

Oil of Roman Chamomile.—According to recent investigations this oil begins to boil at 150° C. (= 302° F.), but very little passes over until 173° C. (= 343.4° F.) is reached; between 173°

and 185° C. (= 343.4° and 365° F.), about 32 per cent. distils over; between 185° and 200° C. (= 365° and 392° F.), 40 per cent.; between 200° and 250° C. (= 392° and 482° F.), 17 per cent. If the fractions so obtained are rectified a slight lowering of the boiling-point is observed. By dissolving the oil in an equal volume of alcohol, adding an equal weight of caustic potassa, allowing the solution to stand thirty-six hours, then distilling with an equal volume of water until oil ceased to pass over, and subjecting the oily distillate to fractional distillation, the author obtained two fractional portions, one of which was butylic, the other amylic alcohol. He concludes the oil of Roman chamomile is a mixture of several compound ethers, among which angelic and valerianic, butylic and amylic ethers preponderate. Zeitschr. Œst. Ap. Ver., December 20th, 1875, p. 585.

Oil of Achillea Ageratum, L.—S. de Luca has obtained and investigated this oil (see Achillea ageratum, L., in this report). It has a sp. gr. at 24° C. (= 75.2° F.) of 0.849; a portion distils over at 165–170° C. (= 329–338° F.), after which it rises and remains constant at 180–182° C. (= 356–359.6° F.). This last portion was found to have a composition corresponding to the formula of $C_{26}H_{44}O_3$. The oil is not affected by oxygen. That portion which distils at 165–170° C. (= 329–338° F.) remains liquid at 18° C. (= 64.4° F.). The oil when treated with chlorine evolves heat, becomes turbid, then again clear, and acquires a faint red color; by neutralizing the HCl formed with carbonate of sodium, an insoluble, light brown liquid is separated, which, when distilled over chloride of calcium, yields a colored liquid. When this is mixed with dry potassa it remains liquid at first, but subsequently forms a doughy mass, which upon distillation yields the oil unchanged. When bromine is added drop by drop to the oil it reacts with a hissing sound, heat is evolved, and when the product is treated with carbonate of sodium, an insoluble oil is formed, which by treatment with potassa and distillation also yields the oil with its original properties unchanged. The author proposes to continue his researches. N. Rep. Pharm., No. 6, 1875, p. 353.

Oil of Orris.—Prof. Flückiger, after referring to the plants yielding the orris root, which seem to be *Iris germanica*, L., and *Iris pallida*, Lam., and not *Iris florentina*, L., as is usually assumed, gives the result of some experiments made with commercial oil of orris, obtained from the manufacturing firms Herrings & Co., of London, and Schimmel & Co., of Leipzig. The average yield of these oils seems to amount to .01 per cent., as determined by the manufacturers. He finds that the solid component (the oil is, as is well-known, concrete in its character) of the oil is entirely devoid of odor, and analysis proved it to be myristic acid, and as it composes a large percentage of the concrete oil, the liquid and odorous volatile oil composes a very small proportion of the root, probably not more than the $\frac{1}{10000}$th part. It separates from the concrete oil as a brownish, thick liquid, when the crude oil is digested with oxide of lead, and remains liquid at a temperature of —10° C. (= 14° F.). The exceedingly small quantity obtained prevented further examination. Arch. Ph., June, 1876, p. 481.

Oil of Cloves.—Ed. Schaer draws attention to an adulteration of oil of cloves with, approximately, 40 per cent. of specifically much lighter oxygenated oil. The mixture boiled at between 165° and 170° C. (= 329° and 338° F.) until about one-half had distilled over, when the temperature rose rapidly to that of the boiling-point of pure oil of cloves. The specific gravity of the adulterated oil was 0.960–0.965; its solubility corresponded to that of pure oil. Schw. Woch. Schr. f. Ph., No. 25, 1875, p. 207.

Eugenol.—Wassermann has undertaken extended researches with a view to the satisfactory establishment of the constitution of eugenol. Pure eugenol was prepared from oil of cloves, freshly distilled from the powder in a current of steam, by treatment with solution of hydrate of potassa, separating the solution from the undissolved hydrocarbon, and precipitating with hydrochloric acid, the absence of salicylic acid having been ascertained. The boiling-point of the pure rectified product is 247.5° C. (= 477.5° F.) at the normal pressure, and its sp. gr. at 0° C. (= 32° F.) = 1.0778 and at 18.5° C. (= 65.3° F.) = 1.0630. Its alcoholic solution reduces nitrate of silver, and yields a blue color with ferric chloride. The sole products of the oxidation of eugenol are acetic acid, water, and carbonic acid, which would prove that the C_3H_5 group contains methyl, and is in all probability methyl-vinyl, a supposition confirmed by the fact that ethyl-eugenol when oxidized yields acetic acid as well as ethylmethoxybenzoic acid. The author details the method of preparing ethyleugenol, and the action of oxidizing agents, bromine, etc., upon it, and eugenol. Journ. Chem. Soc., May, 1876, p. 706; from Liebig's Annalen.

Thymol.—Experiments made by S. Lewin seem to prove that thymol possesses greater power than carbolic or salicylic acid in arresting fermentation in sugar solutions after the addition of yeast. It possesses also the property of retarding the coagulation of milk and the putrefaction of egg albumen and of bony substances. A solution of thymol in 1000 parts of water is sufficiently strong for all purposes. A. J. Ph., September, 1875, p. 346.

Anethol.—Fr. Landolph obtained by repeated rectification of the green Russian oil of anise of commerce 90 per cent. of a product, which boiled between 226° and 230° C. (= 438.8 and 446° F.), and proved to be pure anethol. By heating this for an hour with 6 parts of nitric acid of 30° B., and washing the product of the reaction with water and dilute solution of soda, he obtained about 18–20 per cent. of an oily body, which proved to be a mixture of about equal parts of anisic aldehyd and of anetholhydrid or anise camphor. These were separated by agitation with bisulphide of sodium, washing the crystalline compound of anisic aldehyd and the bisulphite with ether-alcohol until the solution passed colorless, and then distilling off the ether-alcohol. The product,

Anise Camphor, so obtained, was liquid, lighter than water, possesses a strong camphor odor, and boiled between 190° and 193° C. (= 374° and 380° F.). Its composition is $C_{10}O_{16}O$ ($O = 16$). By the action of chromic acid it is converted into a crystalline solid, which has all the properties of anisic acid. Hydrochloric acid does not produce a definite combination with anise camphor, which in this respect also resembles ordinary camphor.

By heating anethol with alcoholic solution of potassa in sealed tubes it is converted into two crystalline compounds; the one of composition $C_{16}H_{18}O_3$ ($O = 16$), and amounting under the most favorable circumstances to about one-half of the resulting products; the other, of composition $C_{14}H_{16}O_2$ ($O = 16$), being the final product, into which the anethol is completely convertible by prolonged reaction. Ch. C. Bl., No. 41, 1875, p. 644; Compt. Rend., 81, p. 97.

Mellilotol.—T. L. Phipson, endeavoring to ascertain how much coumarin could be obtained from *Mellilotus officinalis*, obtained instead a new substance, *mellilotol*, which is converted into the mellilotic acid of Zwenger by the action of potassa. The new substance was obtained to the amount of 0.2 per cent. from the dry plant (stalks, leaves, and flowers) by distillation with water, and isolating it from the distillate by means of ether. Mellilotol is the starting-point of a great variety of interesting compounds, and to it is due the odor of hay-fields, and not to *coumarin*, as has been usually assumed. The latter is produced from the mellilotic acid, which, as before stated, is produced from mellilotol by the action of boiling concentrated solution of potassa, a slight odor of oil of bitter almonds being produced at the same time. Mellilotol is acid in its reaction, slightly soluble in water, soluble in alcohol and ether, and seems to have a composition corresponding to the formula $C_{18}H_8O_4$. Ch. News, July 16th, 1875, p. 25.

Oil and Stearopten of Ledum Palustre.—J. Tropp obtained by the distillation of a large quantity of the leaves of Ledum palustre a quantity of oil, which, upon exposure to the air, soon changed to a crystalline mass. This was found to be nearly insoluble in water, but readily soluble in alcohol, ether, or chloroform, and from such solutions was obtainable in handsome prismatic crystals. Nitric and sulphuric acids produce a violet color with the oil; chlorine, bromine, or iodine change it to a black mass. By boiling the oil with nitric acid handsome yellow crystals were obtained. Ch. C. Bl., No. 25, 1875, p. 393; Ber. Ch. Ges., 8, p. 542.

Camphor.—J. Ribau communicates his researches upon the artificial production of camphor from camphen, and upon the conversion of camphor into camphen. To produce the latter, laurel camphor is first converted into "Borneol" (Dryobalanops camphor, $C_{20}H_{16}O_2$) by the method of Bautigny. By heating the borneol produced with fuming hydrochloric acid it is converted into hydrochlorate of camphen ($C_{20}H_{16},HCl$), and this compound is readily decomposed by boiling with water into camphen and hydrochloric acid. The decomposition is, however, most conveniently effected by heating the hydrochlorate in a close vessel with an excess of solution of potassa in alcohol at 180° C. (= 356° F.) for seventy hours, precipitating the alcoholic solution with water, fractioning the precipitated hydrocarbon, and, finally, expressing so as to remove traces of oily bodies. The camphen so obtained, which the author names

Borneo-camphen, is a crystallized body of composition $C_{20}H_{16}$. It melts at 47° C. (= 116.6° F.), and boils at 157° C. (= 324.6° F.).

Artificial Camphor, corresponding in its composition and characters to ordinary camphor, was obtained by the author as follows: Active left-rotating camphen from French oil of turpentine was oxidized by heating in a retort with reversed condenser for about fifteen hours with a chromic acid mixture, sulphuric acid being used in the latter in sufficient quantity to saturate the oxide formed. A current of steam was then passed through the mixture in the retort, by which the camphor, along with the acetic acid which had formed, was distilled over. The product was washed with an alkaline solution, and then subjected to fractional distillation, that portion remaining in the retort at 204° C. (= 399.2° F.) being each time reserved. Finally it was purified by sublimation at 100° C. (= 212° F.). Ch. C. Bl., No. 34, 1875, p. 532; Compt. Rend., 8, p. 1381.

Monobromated Camphor.—Clin has obtained splendid specimens of this product by the direct action of bromine upon camphor at 100° C. (= 212° F.), without pressure and without distillation. Ch. News, September 17th, 1875, p. 145.

The results of Prof. J. M. Maisch (see Proceedings, 1873, p. 324) have anticipated this, while the transformation of bibromated into monobromated camphor takes place at 100° C. (= 212° F.); a temperature of 132° C. (= 271.6° F.) greatly facilitates the conversion. Rep.

Oil of Bitter Almonds.—Most text-books give the solubility of this volatile oil in 30 parts of water, a statement which Professor Flückiger finds to be erroneous, and which probably has its source in a misprint of the original statement of its solubility, which should have stated 300 parts instead of 30, this latter quantity being found nearly correct. Neither the ordinary oil, containing hydrocyanic acid, nor that deprived of hydrocyanic acid, or freed from products of oxidation, such as benzoic acid, etc., have a greater solubility in water, and their solubility is not perceptibly increased by heat. Arch. Pharm., August, 1875, p. 103.

Amyrin.—Professor Flückiger, in his valuable contribution on the chemistry of elemi, had determined the formula for *bryoidin*, a crystallizable substance occurring in small quantities in that drug, to be $(C_{10}H_{16})2 + 3OH_2(O = 16)$, and expressed the opinion that *amyrin*, the preponderating constituent of the drug, had a composition corresponding to the formula $(C_{10}H_{16})2 + OH_2(O = 16)$. Eugen Buri has now made a series of experiments, by which he finds its composition to correspond to the formula $(C_5H_8)5 + OH_2$ $(O = 16)$, and gives the following interesting information regarding its preparation and properties: Amyrin exists in elemi in the form of microscopic prisms, which remain undissolved when elemi is treated with cold alcohol of 90°, and is purified by recrystallization from boiling alcohol until it appears perfectly colorless, and no longer loses weight when treated with boiling water. It crystallizes from hot alcohol on cooling in form of colorless, doubly-refracting needles, which are united into ball-shaped aggregations having a silky lustre; is insoluble in water, very sparingly in cold alcohol, readily in hot alcohol, in ether, chloroform, and bisulphide of carbon. It melts at 177° C. (= 350.6° F.), remains liquid below its melting-point, and congeals finally to a colophoniumlike mass, from which it may again be obtained in crystals by solution in hot alcohol. By very careful heating it may be sublimed, form long, extremely thin crystals, aggregated in cobweblike masses, and the so sublimed amyrin may be again obtained in the original crystalline form by recrystallization from alcohol. The author describes its relation to, and some of the products obtained by, the action of strong mineral acids, acetic acid, and bromine, and also the products of its destructive distillation. N. Rep. Ph., No. 4, 1876, pp. 193 to 304.

Copaivate of Sodium.—L. Géza distils the copaiva with water to remove the volatile oil, and purifies the residual resin by repeated solution in rectified petroleum and alcohol. The crystallized copaivic acid is then combined with soda. Dr. Zlamál has used this compound successfully in the form of pills made by using 2 parts of the copaivate, 1 part of dextrin, and sufficient oil of sandalwood to flavor. A. J. Ph., May, 1876, p. 218; from Pharm. Post, 1876, No. 6.

ALCOHOLS, ETHERS, ETC.

Alcohol.—Volumetric Estimation.—When a salt of cobalt is added to an alcoholic solution of sulphocyanide of ammonium an intense blue color is produced. This color rapidly disappears on the addition of water, and returns on the addition of alcohol. The same percentage of alcohol and volume of liquid, with the same amount of standard blue solution, always has exactly the same intensity of color, in whatever order the alcohol and water are added. T. T. Monell finds that by this reaction it is possible to determine volumetrically, to about one-quarter per cent., the quantity of alcohol in mixtures. If we put into a large mixing cylinder a measured quantity of the dark standard blue solution, and pour upon it the mixture to be tested until the tint matches that of a strip of very pale blue glass, the volume so tinted will be greater as the mixture is stronger in alcohol. These volumes once determined would always hold good, and the per cents being marked on the cylinder, could be read at once. The standard dark blue should always be made with alcohol of the same strength, and standardized by the same strip of blue glass used in the actual analysis. Nitrate of cobalt is very suitable to produce the blue color, which appears to be very permanent. Am. Chem., April, 1876, p. 370.

Estimation of Methylic and Amylic Alcohols in Whisky.—It is stated that whisky (in Great Britain) is now and then adulterated with methylated spirits. A. Dupré believes these instances to be extremely rare, if ever practiced at all, but gives a method which he has successfully used for determining such adulteration. Five fluid ounces of the suspected spirit are distilled twice, having been rendered alkaline the first time, and acid the second time, about two-thirds being distilled over each time. The distillate is now shaken with dry carbonate of potassium, and after standing over night the upper layer is taken off by a siphon or pipette, and again distilled twice, about half an ounce being driven over each time. The last half ounce will contain any methylic alcohol present in the original five ounces. All the distillations should be conducted in an apparatus having the receiver connected air-tight with the condenser, and furnished with a mercury valve, allowing the expansion and contraction of the air, but preventing loss by evaporation during the distillation. About one-third of the final distillate is now diluted to a strength of from 10 to 15 per cent., or 70 fluid grains are made up to 500 grains by the addition of distilled water. In this diluted spirit the alcohol is determined, 1st, by specific gravity; 2d, by means of Geissler's vaporimeter; and 3d, by oxidation into acetic acid, and volumetric estimation of the latter. With pure alcohol, all these methods give results which should agree to within at least one-tenth of one per cent. If, however, any appreciable amount of methylated spirit is present, the results will differ more or less widely. The spirit gravity of the two alcohols is almost identical; the vaporimeter will give a high result if methylic alcohol is present, while the oxidation will, under the same circumstances, yield a lower result. From the differences so observed, the presence of two or three per cent. of methylated spirit would be distinctly recognizable.

The method for detecting fusel oil, is dependent upon the fact that most of the various higher homologues of ethylic alcohol, of which it is composed, yield, when oxidized by means of sulphuric acid and bichromate of potassium, corresponding acids, and these latter are much more readily separated than the alcohols. An amount of spirit containing from one to two grams of alcohol, previously distilled if necessary, is oxidized in a closed flask by means of sulphuric acid and bichromate of potassium, care being of course taken to have an excess of this mixture in the flask. The author usually digests the flask on a water-bath for two hours. When cool the flask is opened, the excess of bichromate present reduced by zinc, and the acids produced are distilled off. The distillate is neutralized with a standard solution of normal soda, the solution evaporated to a small bulk, and transferred to a retort. An amount of sulphuric acid equal to one-twentieth of the normal alkali used is now added, and the contents of the retort are distilled to dryness on an oil-bath; the temperature being allowed to rise to about 130° C. (= 266° F.). Water is now added, together with the same quantity of acid, and distillation is performed as before, some water being then added to the dry residue, and this again distilled to dryness, and this is repeated twice. The united distillates (two with acid and three with water), contain all the acids of the higher series than the acetic acid, together with a portion of this latter. The acid liquid is converted into a barium salt, evaporated to dryness, and the residue dried at 130° C. (= 266° F.), and weighed. The amount of barium in the salt is estimated in the usual way by conversion into sulphate, and the necessary data so obtained for estimating approximately the quantity of fusel (fousel) oil contained in the spirit under examination, on the assumption that it consists either of amylic alcohol or of any other alcohol that may be supposed to be the chief impurity present. The real amount cannot of course be obtained without a knowledge of the exact nature of the acids produced. Ph. J. Trans., April 29th, 1876, p. 867.

Brandy.—Artificial Color.—The dark color of brandy is naturally communicated to it by the wood of the casks in which it is kept for a long time. To detect the use of caramel, which is generally used to produce the color of age artificially, Carles recommends the use of albumen or sulphate of iron. If the white of egg be added to two different portions of brandy, one artificially colored and the other not, to the extent of about one-sixth, and they be then shaken, the mixtures become very turbid. Upon standing, however, a limpid liquor comes to the top, which retains the yellow color in brandy to which caramel has been added, but is completely colorless if the brandy has become naturally colored from wood. If a few drops of solution of sulphate of iron is added to brandy naturally colored, a greenish-black color of greater or less intensity, according to the color acquired by age, is produced, while in artificially colored brandy no such change is produced. Ph. J. Trans., August 14th, 1875, p. 133.

Spiritus Frumenti Rectificatus.—A. W. Miller advocates, and supports by very able arguments, the introduction of the *pure rectified spirit* of commerce into our National Pharmacopœia in lieu of whisky and brandy, which, he thinks, should be expunged from that standard. He argues that, since alcohol is doubtless the sole medicinal component of the last-named liquors, while the fusel oil and ethers, to which their peculiar flavor and bouquet is due, cannot be so regarded, a product which is completely deprived of these, should certainly be preferable from a medical point of view. This is afforded by the rectified spirit, which is almost always pure, and readily obtained at a much less expense than the liquors now officinal. While the taste and odor of rectified spirit is not so tempting as that of choice cabinet liquors, it is entirely free from the disgusting smell and flavor of the ordinary diluted alcohol. As it occurs in commerce it contains exactly 50 per cent of absolute alcohol by volume. A. J. Ph., November, 1875, p. 490.

Alcohol in Plants.—Dr. H. Gutzeit has determined the natural occurrence of alcohol, or one of its ether compounds, in certain fruits, among which the fruit of *Heracleum giganteum hort.*, of *Pastinaca sativa*, L., and of *Anthriscus cerefolium*, Hoffm. Hitherto its occurrence in the vegetable kingdom has not been observed with certainty, and the author regards this as the more remarkable since methylic alcohol, or rather its ether derivatives, have long since been known as normal constituents of some plants, while the occurrence of acetic acid or its compounds—the product of the oxidation of ethylic alcohol—is most naturally attributable to the preexistence of ethylic alcohol. By distillation with water of the not quite ripe fruit of *Heracleum giganteum* the author obtained a distillate which contained considerable quantities of ethylic alcohol and some methylic alcohol, the former preponderating largely. The ripe fruit, to the contrary, yielded methylic alcohol in excess. His further experiments render it probable that the ethylic alcohol exists in the fruit in the form of butyro-ethylic ether, and that it is formed by the decomposition of the latter during the distillation. In the aqueous distillate obtained from the fruit of *Pastinaca sativa* the author found ethylic alcohol, but failed to determine the presence of ethylic ether, while in the distillate from the fruit of *Anthriscus cerefolium* he obtained an ethyl compound, the exact nature of which he has not yet succeeded to determine. Zeitschr. Œst. Ap. Ver., No. 21, 1875, p. 337.

Perchloride of Ethylen.—E. Bourgoin recommends the following method for its preparation, which gives better results than that originally pursued by its discoverer, Faraday. Sesquichloride of carbon is dissolved by the aid of heat in twice its weight of commercial anilin, and subjected to distillation at a temperature of 170° C. (= 338° F.), this process requiring, with 500 grams of substance, about six hours. The distillate consists of perchloride of ethylen contaminated with anilin and undecomposed sesquichloride of carbon. The latter is removed by redistilling at a temperature of 130° to 145° C. (= 276° to 293° F.) with a new portion of anilin; the latter is readily removed from the second distillate by sulphuric acid, and the product is then simply dried over chloride of calcium. The residue in the retort is anilin-red. The perchloride of ethylen so obtained is not absolutely pure; it has an odor reminding of chloroform; its boiling-point is not absolutely constant; the greater part distils at 121° C. (= 249.8° F.), and its sp. gr. at 0° C. (= 32° F.) is 1.6595. Ch. C. Bl., No. 27, 1875, p. 421; Bull. Soc. Chim. Par. (N. S.), 23, p. 344.

Spirit of Nitrous Ether.—Oakley Griggs prepared some spirit of nitrous ether according to the process of the U. S. P., and subjected this, together with 7 commercial samples, to an examination. The proportion of nitrite of ethyl was determined volumetrically by a standard solution of permanganate of potassium, according to Feldhaus's method.* The test for aldehyd was made by adding reagent solution of potassa, and setting aside for twelve hours. No. 8 in the following tabulated statement is the spirit prepared by the author:

Sample.	Sp. Gr.	Nitrite of Ethyl. Per cent.	Test for Aldehyd.
1	0 894	3.7	No deposit, but a red solution.
2	0.887	4 2	Considerable deposit; deep red solution.
3	0.859	4.0	Slight deposit; reddish solution.
4	0.903	3.5	Much deposit; amber-colored solution.
5	. . . .	4.4	No deposit; light straw-colored solution.
6	0.900	3.8	Slight deposit; light straw-colored solution.
7	0.933	4.1	Much deposit, dark-red solution.
8	0.834	5.4	No deposit; yellow to reddish solution.

A. J. Ph., Oct. 1875, p. 463.

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* Archiv Pharm., 1860, April.

G. W. Kennedy has also examined a number of commercial samples of spirit of nitrous ether, and compared them with a freshly made spirit prepared by him. The results are stated in tabulated form, and embrace the specific gravity, the percentage of nitrite of ethyl, the reaction on bicarbonate of potassium, tests for free nitrogen acids and for chloride of ethyl, the reaction on litmus, and the color of the spirit. A. J. Ph., June, 1876, p. 259.

Sweet Spirit of Nitre.—Referring to a statement which had recently been made, that a mixture of equal parts of syrup of ginger, fluid extract of uva ursi, and sweet spirit of nitre, developed, upon standing, enough gas to either force out the cork or break the bottle, J. Creuse gives the result of investigations made in this connection, by which he proves that sweet spirit of nitre is an oxidizing agent, which, by its oxidizing action upon the tannin of the fluid extract of uva ursi, is capable of producing the above described effect. Thus he finds, that on mixing weak solutions of tannin with spirit of nitrous ether, the liquid is immediately darkened, the color becomes somewhat deepened after a time, and remains dark when the reaction is ended. A slight effervescence is also observed. But when a solution containing 25 to 30 per cent. of tannin is mixed with an equal volume of spirit of nitrous ether, the reaction is quite brisk; the liquid foams, an abundance of gas is evolved, and a smell resembling that of hyponitric acid is developed. The mixture, at the same time, becomes almost black and quite thick, and if no vent is afforded, of course, an explosion may result. Gallic acid appears to behave in the same manner. It is immaterial for this reaction whether the spirit of nitrous ether be acid or neutral. The author has not yet had time to examine the products of the reaction. Dr. Circ., May, 1876, p. 86.

Experiments made by J. W. Landis, with fluid extract of uva ursi and sweet spirit of nitre of his own manufacture, in which no reaction had taken place between the two after 36 hours' standing, whilst, upon the addition of a few drops of free nitrous acid to the mixture, effervescence immediately occurred, lead him to the conclusion, that such reaction occurring in a mixture of sweet spirit of nitre, fluid extract of uva ursi, and syrup of ginger, is due to the presence of free nitrogen acids in the spirit of nitre. Ibid., p. 87.

Ethylthiosulphate of Sodium.—William Ramsey states that he had prepared this compound in the same manner as Bunte (Ber. d. Deutsch. Ch. Ges., vii, 646), before the latter published his process.

The salts of ethylthiosulphuric acid are so easily decomposed that it is impossible to prepare others from the sodium salt originally obtained. Bunte had made the statement that its solutions afforded with the nitrates of silver or of lead sparingly soluble precipitates. The author finds that the precipitate formed with nitrate of silver turns black upon standing a few minutes, sulphide of silver being formed. With mercuric salts a similar precipitate is produced, and this changes in the same manner. When the sodium compound is added to chloride of barium, decomposition ensues in a few hours, and chloride of sodium, dithionate of barium, and disulphide of ethyl are formed. The sodium salt decomposes after a few weeks. The acid cannot be prepared from this, but it may possibly be prepared from the barium salt, the preparation of which he has not succeeded in. J. Chem. Soc., Aug. 1875, p. 687.

Chloroform.—H. P. Madsen confirms Rump's statement, that it requires a large quantity of water to separate alcohol from chloroform. The Danish Pharmacopœia requires chloroform to be shaken with an equal weight of water, with which proportions the author did not obtain a higher sp. gr. than 1.457; but by using a fourfold quantity of water he obtained a chloroform of sp. gr. 1.490. A. J. Ph., December, 1875, p. 537; from Arch. for Ph., 1875, p. 281.

For some two years the firm of E. Schering, of Berlin, has repeatedly drawn attention, through the pharmaceutic press, to their chloral-chloroform, claiming for it that its absolute purity and consequent freedom from acetals (chlorinated ethers) as well as from alcohol, insured its stability and its safety in administration. Dr. C. Schacht has repeatedly drawn attention to the fallacy of this assertion, and in a recent paper gives the result of some careful experiments, by which he proves the correctness of his views. He used for his experiments a chloroform, which had been prepared from very pure crystals of chloral by Messrs. Saame & Co., of Ludwigshafen, A. R. This chloroform was of sp. gr. 1.4924 at 17° C. (= 62.6° F.), and evidently contained a small percentage of alcohol. To remove the latter the chloroform was treated with sodium, distilled from sodium, and, not being entirely deprived of the alcohol, was kept for some time over chloride of calcium, and then again rectified over sodium. In this manner a product of sp. gr. 1.5320 at 0° C. (= 32° F.) was obtained, which was perfectly indifferent to solutions of nitrate of silver, or to solutions of bichromate of potassium. Having thus obtained an *absolutely* pure chloral-chloroform, it was exposed for a short time to air and light, when it was found to have undergone partial decomposition, and that phosgen gas had abundantly formed. Identical results having been obtained at different periods and under varying conditions, Dr. Schacht's experiments doubtless completely refute the assertions of Schering. Schweiz. Woch. Schr. f. Ph., No. 38, 1875, p. 323.

Iodoform.—H. M. Wilder recommends Bouchardat's process for its preparation as easy of execution and giving a fair yield; but for obtaining the largest yield Filhol's process is the best. For cleansing mortars and other utensils in which iodoform was used, an alcoholic solution of potassa or soda is recommended; or, if this does not fully accomplish the purpose, a concentrated solution of bichromate of potassium with sulphuric acid. Proceedings, 1875.

McElhennie finds that iodoform is dissolved with comparative ease by oil of sweet almonds, as much as 10 grains being taken up by a fluid ounce. He has also found that the addition of sugar very greatly facilitates the reduction of iodoform to a fine powder. A. J. Ph., November, 1875, p. 519.

Chloral-hydrate.—When concentrated aqueous solutions of *cyanate of potassium* and chloral-hydrates are mixed in the proportions of their molecular weights, violent reaction soon results and carbonic acid is copiously evolved. The liquid deposits small, white crystals, which O. Wallach has found to have the composition $C_4H_2Cl_2N_2O_2$ ($O = 16$), and the substance is, therefore, different from that obtained by Cech by the reaction of *cyanate* and *cyonide of potassium* upon chloral-hydrate, for which the latter gives the formula $C_4H_3Cl_3N_2O_2$ ($O = 18$). The above-mentioned substance is not the only product formed during the reaction; under other conditions certain products are formed which Wallach has not yet examined. Violent reaction also occurs when *sulphocyanide of potassium* and chloral-hydrate are brought together, and the reaction of *ferrocyanide of potassium* upon this aldehyd is remarkable, since by boiling their aqueous solutions together, hydrocyanic acid is liberated, and an abundant green-blue precipitate forms. Ch. C. Bl., No. 48, 1875, p. 756.

Chloral and Chloralid.—J. Grabowsky finds that chloralid is best prepared by heating 3 parts of chloral and 1 part of fuming sulphuric acid to 105° C. (= 221° F.). It crystallizes from alcohol in long prisms, melting at 114°–115° C. (= 237.2°–239° F.), and boiling at 268° C. (= 513.4° F.), and its vapor density is 11.3.

Pure chloral can be kept in sealed tubes without any change, but if after opening the tubes a little moisture enters, the formation of insoluble chloral commences and at the same time hydrochloric acid is formed, but on sealing the tubes again the polymerisation ceases as soon as the water and chloral have been converted into hydrochloric acid and chloralid.

Insoluble chloral, after having been freed from any chloralid by boiling with water and alcohol, is completely converted into common chloral when heated in Hofmann's apparatus in a current of naphthalen-vapor. J. Chem. Soc., April, 1876, p. 551; from Deut. Ch. Ges. Ber.

O. Wallach finds that when chloralid is treated with zinc and hydrochloric acid in presence of alcohol, it yields aldehyd and an acid body which crystallizes from ether and forms very soluble calcium and barium salts and a crystallizable silver salt. According to analysis this acid is *dichloracrylic acid.* It melts at 75° to 77° C. (= 167° to 170.6° F.), is sparingly soluble in water, easily soluble in alcohol and ether, and volatilizes at the ordinary temperature forming brilliant laminæ. When chloralid is kept for some months in alcoholic solution, or is heated with alcohol in sealed tubes, it is resolved into chloral-alcoholate and into a substance identical in composition and all the properties of the *trichlorolactate of ethyl*, as obtained by Pinner from trichlorolactic acid. Ibid.

Chloral and Crotonic Chloral.—A. Pinner and C. Bischoff have studied the reactions and the products formed by the action of hydrocyanic acid on these bodies. By digesting chloral with hydrocyanic acid,

Chloral Cyanhydrid is obtained. This forms colorless prisms, which may be readily obtained pure by recrystallization from water, and are readily soluble in alcohol and in ether. When this compound is digested with concentrated hydrochloric acid, it is decomposed in a manner perfectly analogous to that observed by Simpson and Gautier when aldehyd cyanhydrid is submitted to similar treatment. The product of the reaction is

Trichlorolactic Acid, which they have combined with bases (ammonium, potassium, sodium, and zinc), and with which they have also prepared trichlorolactate of ethyl. These compounds are described. By the reduction of trichlorolactic acid the authors obtained *malonic* and *chloracrylic acid*, and from the latter they prepared the ethyl compound.

By the action of hydrocyanic acid upon croton-chloral in alcoholic solution, the authors obtained

Croton-chloral-cyanhydrid. This is a crystalline compound, which is very sparingly soluble in cold water, more readily in hot water, and still better in alcohol and ether. It melts at 101°–102° C. (= 213.8°–215.6° F.). It dissolves in hot dilute hydrochloric acid without change, and crystallizes out unchanged on cooling; but hot concentrated hydrochloric acid decomposes it,

Trichlorangelactic Acid being formed. This, in its turn, may by a reduction with hydrochloric acid and zinc, be reduced to *monochlorangelactic acid.* J. Chem. Soc., April, 1876, p. 554; from Deut. Ch. Ges. Ber.

Butyl-chloral (Croton-chloral?).—In a recent article in the "Deutsche Medicinische Wochenschrift," Dr. Oscar Liebreich states that Messrs. Krämer and Pinner, in the course of their researches on the substance "commonly called croton-chloral," have ascertained that it contains two more atoms of hydrogen than was supposed, and that it is in fact *butyl-chloral.* When soda or another alkali is mixed with it, it is decomposed, chloride of sodium, formiate of sodium, and bichlorallylen being produced. Regarding the mode of administration of butyl-chloral, Dr. Liebreich says that he has tried an alcoholic solution; but he has found that, after long standing, some change takes place which greatly impairs its action. He now orders it in the following form: Butyl-chloral, 5 to 10 parts; glycerin, 20 parts; distilled water, 130 parts. Shake well before using. Ph. J. Trans., February 19th, 1876, p. 666; from British Med. Jour., February 12th, 1876.

Methylic Oxide.—C. Friedel finds that when a mixture of methylic oxide and of hydrochloric acid, pure and dry, is passed into a receiver, imbedded in a freezing mixture, a colorless mobile liquid is condensed, which is analogous to the known compounds of ether (ethyl-oxide) with metallic chlorides, and to those of ethyl-oxide and bromine, discovered some time ago by Schützenberger. The new compound fumes on exposure to the air, and distils over between —3° and —1° C. (= 26.6° and 30.2° F.). Ch. N., August 20th, 1875, p. 83; from Compt. Rend., July 9th, 1875.

Chloro-methylic Oxide.—The danger of explosion during the preparation of this compound is avoided by Friedel by admitting the chlorine with an excess of oxide of methyl through a long tube into a common recipient in which the gases are exposed to diffused daylight, and collecting the compounds formed in a set of two U tubes, one of which is cooled with ice-water, and the other with a freezing mixture; the latter for the purpose of condensing a compound of hydrochloric acid and oxide of methyl, which boils at 0° C. (= 32° F.). If the light is too strong during the operation, that portion of the apparatus through which the chlorine enters must be covered with a black envelope; otherwise the chlorine ignites, without explosive effect, however. Chloro-methylic oxide boils at 60° C. (= 140° F.), has an odor resembling chloride of acetyl, is decomposed by water with evolution of hydrochloric acid, and with solution of potassa produces a liquid having an odor which resembles that of alcohol. Ch. C. Bl., No. 27, 1875, p. 420; Bull. Soc. Chim. Par. (N. S.), 23, p. 386.

Nitrate of Methyl.—This compound has in recent years found useful application for the industrial production of various anilin colors and other chemical compounds, replacing since 1862 the more expensive iodide of methyl almost completely. A serious drawback to its application, however, consists in its violent explosive character, in which it resembles nitroglycerin very closely. With a view to the removal or modification of this dangerous character, Ch. Girard has experimented and found that by the addition of various alcohols, such as methylic, ethylic, amylic, etc., or of aceton, benzol, toluol, etc., the explosive properties of nitrate of methyl may, under certain circumstances, be almost completely overcome. The author has, furthermore, determined that, like nitroglycerin, it is capable of exploding when subjected to a violent shock, and that with solid porous bodies it produces a compound having explosive power akin to dynamite. Ch. C. Bl., No. 23, 1875, p. 361; Bull. Soc. Chim. Par. (N. S.), 32, p. 63.

Nitrite of Amyl is recommended by Bader as an antidote to chloroform when inhaled in excess. A few drops of the nitrite are poured upon a cloth and the mouth and nose of the patient covered with this. Normal respiration soon takes place, followed, however, by nausea. Ch. C. Bl., No. 41, 1875, p. 654.

Nitrate of Amyl.—The designations, *amyl nitrite* and *amyl nitrate*, have often led to mistakes in substituting one for the other, hence the "Pharmaceutische Zeitung" recommends to employ the names *nitrite of amyl* and *nitrate of amyl*. The latter differs from the nitrite of amyl in the following particulars: It has a higher specific gravity (0.919), a higher boiling-point (147° to 148°), and possesses a very disagreeable cimicular smell. Chem. and Drug., July 15th, 1875.

Allyl-alcohol has, by B. Aronheim, been found among the products of the destructive distillation of wood, and it is to its presence that crude methylic alcohol owes its very penetrating odor. After the methylic alcohol is distilled from the crude wood spirit, allyl-alcohol collects in the aqueous distillate, and may be obtained nearly free from water (1 mol.) by repeated rectification from lime. By proper treatment it may be obtained entirely free from water, and then has all the characteristics of pure allyl-alcohol. Arch. Ph., July, 1875, p. 66.

Sulphocyanide of Allyl.—O. Billeter obtained this compound by acting upon iodide of allyl with sulphydrate of potassium, dissolving the sulphydrate of allyl formed in alcohol and precipitating with acetate of lead. The precipitated lead compound was digested with a solution of chloride of cyanogen in anhydrous ether for twelve hours, the clear solution filtered from the undissolved portion and allowed to evaporate spontaneously. The product was a faint yellowish colored oil, possessing a peculiar, intense, but not unpleasant odor, and proved to be nearly pure sulphocyanide of allyl. It did not possess the least resemblance to the odor of essential oil of mustard, but was converted into this isomere immediately upon heating. Ch. C. Bl., No. 25, 1875, p. 390; Ber. Chem. Ges., 8, p. 462.

G. Gehrlich had previously determined that sulphocyanide of allyl is, by the action of heat, converted into vol. oil of mustard. He describes the pure sulphocyanide of allyl as a colorless, oily, strongly-refractive liquid, which gradually acquires a yellow color when exposed to light, is sparingly soluble in water, readily in alcohol, and miscible in all proportions with ether. Its odor resembles that of leek, and faintly reminds of hydrocyanic acid; but when heated and converted into its isomere—volatile oil of mustard—cannot be distinguished from that. Its sp. gr. at 0° C. (= 32° F.) = 1.071, and at 15° C. (= 59° F.) = 1.056. Strong ammoniacal solution of nitrate of silver produces no immediate reaction, but after a time slight opalescence takes place. Oil of mustard produces an immediate brown precipitate which subsequently becomes black. Alcoholic solution of corrosive sublimate produces after a time a gray precipitate, while oil of mustard is immediately precipitated white. The reaction of the two isomeres is the same with mercurous nitrate, but the gray precipitate of the sulphocyanide of allyl requires some time to form. The well-known reaction of strong ammonia solution upon oil of mustard is not produced upon the sulphocyanide. The latter boils at 161° C. (= 321.8° F.).

When sulphocyanide of allyl is prepared from iodide of allyl, which has been made according to the old methods—with iodide of phosphorus and glycerin—a portion of sulphocyanide of *isopropyl* is also formed, owing to the contamination of such iodide of allyl with iodide of isopropyl. Hence artificial mustard oil may contain a portion of the isopropyl compound, and hence also the variation in the sp. gr. as found; sulphocyanide of isopropyl being lighter than water. This compound has an ethereal odor, boils at 152°–153° C. (= 305.6°–307.4° F.) and has a sp. gr. at 0° C. (= 32° F.) = 0.989, and at 15° C. (= 59° F.) = 0.974. As it does not possess by far the irritating action upon the skin that the artificial mustard oil does, its presence in the latter is objectionable. In the natural oil of mustard, on the other hand, there is always more or less *cyanide of allyl*, formed both during the reaction of myronate of potassium and emulsin, and the rectification of the oil in the presence of water. Cyanide of allyl is lighter than water, having a sp. gr. at 0° C. (= 32° F.) = 0.849, and at 15° C. (= 59° F.) = 0.835. It does not blister, and but faintly irritates the skin; hence the author considers the pure artificial oil of mustard preferable to the natural oil containing appreciable quantities of cyanide of allyl. Artificial oil of mustard is now prepared exclusively from iodide or bromide of allyl obtained from allyl alcohol, and hence contains no sulphocyanide of isopropyl. He prefers the bromide to the iodide for its preparation; reacting upon the former with sulphocyanide of ammonium at 0° C. (= 32° F.). The resulting sulphocyanide is heated in a flask with a reversed condenser, until its boiling-point—161° C. (= 321.8° F.)—is reduced to 148°–149° C. (= 298°–300.2° F.) indicating its transformation into oil of mustard. The latter has a sp. gr. at 0° C. (= 32° F.) = 1.036, and at 15° C. (= 59° F.) = 1.021. Arch. Ph., August, 1876.

Volatile Oil of Mustard.—The Pharm. Germ. makes the requirement that this volatile oil be soluble in 50 parts of water, and that when it is agitated with three volumes of concentrated sulphuric acid, and kept cool during the shaking, it should form a dense or crystalline mass. Hager draws attention to the fact that oil of mustard is much less soluble, requiring from 120 to 280 parts of water at medium temperature, according to its age; old oil being much more soluble than the fresh oil. Regarding the action of concentrated sulphuric acid, he states that the formation of a crystalline mass is of extremely rare occurrence with the pure oil, and that the alternative "a dense mass," is also not significant of the real condition usually produced, which is really that of a dense, thick-flowing (syrupy) liquid. This latter is the condition described by Flückiger, whose authority seems to have been adopted in the Ph. Germ., but, as is evident, misquoted. Ph. Centr. H., No. 43, 1875, p. 361.

Carbolic Acid.—W. F. Koppeschaar proposes bromine-water for the volumetric determination of carbolic acid. A known volume of bromine-water, more than sufficient to change all the phenol present into tribromophenol, is added, and the excess of bromine is then titrated in the usual manner, by first substituting iodine for it by adding iodide of potassium, and estimating the iodine by means of hyposulphite of sodium with starch as indicator. The reagents required are: 1. A solution of hyposulphite of sodium that agrees in volume strength with an iodine solution of 5 grams in the litre. 2. A filtered solution of starch. 3. Bromine water contained in stoppered bottles of at least 550 c.c., and which is of such strength that 50 c.c. require after decomposition with iodide of potassium 18 to 20 c.c. of the solution of hyposulphite of sodium. 4. A solution of iodide of potassium that contains 125 grams in the litre. With these solutions the analysis is made as follows: A clear solution of the sample of carbolic acid to be analyzed is made by dissolving 4 grams in distilled water to a volume of 1000 c.c.; then 25 c.c. of this solution is transferred to a half-litre flask provided with a well-ground glass stopper; the flask is filled with bromine-water to the mark, carefully closed and well shaken; but before adding the bromine-water its titre must be determined. After the lapse of a quarter of an hour the contents of the flask are poured into a large beaker containing 10 c.c. of the solution of iodide of potassium, and the flask is rinsed twice with distilled water. Lastly, the liberated iodine is titrated with the solution of hyposulphite of sodium, the starch solution not being added until near the end. If the blue color does not return within a couple of minutes the process is ended. The author also gives a method in which the bromine is used in *status nascenti*, in which he substitutes a solution of a mixture of bromide and bromate of sodium (obtained by acting upon soda solution with excess of bromine, and evaporating to dryness), and adds hydrochloric acid to liberate the bromine. By this method the unpleasant bromine vapors are avoided. Ph. J. Trans., April 15th, 1876, p. 824.

Prof. E. Jacquemin has discovered a new reaction of carbolic acid, which, owing to its extreme sensitiveness, he believes to be of great value in forensic analysis. It consists in adding to the solution containing the acid a little anilin, followed by solution of hypochlorite of sodium, when, after a short time, an intense blue color is produced, owing to the formation of erythro-carbolate of sodium. The reaction becomes evident in 2 litres of water containing 1 drop of the acid, if a drop of anilin and then hypochlorite are added to it. Dr. Hager suggests that this method must be accepted with caution, since anilin alone produces a deep violet solution with hypochlorite. Prof. Jacquemin in his paper reviews the various methods of separating carbolic acid for forensic determination from various organs, from blood, urine, milk, soaps, etc. Ph. Centralhalle, No. 37, 1875, p. 309.

E. Heintz has observed that carbolic acid is reddened by the influence of both heat and light, and therefore considers it expedient to exclude these by proper precautions. Arch. Ph., April, 1876, p. 325.

Camphorated Phenol.—Bufalini describes a combination of camphor and phenol, which, he states, produces the same effects as carbolic acid, but is less dangerous. One part of carbolic acid and two of camphor are mixed in a vessel, and allowed to stand some hours. A reddish-yellow oily liquid will be formed, which is purified by washing with water. The oily product has the odor of camphor, is insoluble in water, but soluble in alcohol and ether. It may be used both internally and externally. When applied to wounds it does not irritate them, or act as a caustic or disorganizing substance on them, and it may be used internally in large doses without producing symptoms of poisoning. Dr. Cir., September, 1875, p. 153.

Glycerin.—According to Champion and Pellet, the following qualitative method of analysis answers well for the detection of impurities in glycerin, which has not been adulterated: The glycerin is diluted with twice its weight of water, and is then tested:

1. With basic acetate of lead. This precipitates all *natural* impurities in commercial glycerin, with the exception of lime. If the precipitate is very copious, the glycerin is unfit for many industrial purposes, and is particularly unfit for the manufacture of nitroglycerin.

2. With oxalate of ammonium for lime, which it may contain in combination with fatty acid.

3. With vegetable coloring matters, towards which it must have neutral reaction.

The color of glycerin does by no means afford a criterion of purity. Glucose is best detected by Fehling's reagent.

The quantitative analysis is made by determining the quantity of foreign organic matter by means of basic acetate of lead, washing and drying the precipitate, heating to redness, dissolving the oxide of lead in nitric acid, and determining the quantity of oxide of lead as sulphate by well-known methods. The difference between the weight of the lead precipitate and of the oxide of lead found gives the weight of the foreign organic matter, which seldom amounts to more than 1–1.5 per cent. The lime is determined as oxalate. The water by the sp. gr. at 15° C. (= 59° F.), according to the following table, which is based upon recent determinations of the author, and which deviates somewhat from the figures obtained by A. Vogel, W. Fuchs, H. Schweikert, Fabian, and A. Metz:

Sp. Gr.	Degrees, Baumé.	Percentage of water.	Sp. Gr.	Degrees Baumé.	Percentage of water.
1.2640	31.2	0.0	1.2350	28.6	11.0
1.2620	31.0	0.5	1.2335	28.4	11.5
1.2612	30.9	1.0	1.2322	28.3	12.0
1.2600	30.8	1.5	1.2307	28.2	12.5
1.2585	30.7	2.0	1.2295	28.0	13.0
1 2572	30.6	2.5	1.2280	27.8	13 5
1.2560	30.4	3.0	1.2270	27.7	14.0
1.2545	30.3	3.5	1.2255	27.6	14.5
1.2532	30.2	4.0	1.2242	27.4	15.0
1.2520	30.1	4.5	1.2230	27.3	15.5
1.2505	30 0	5.0	1.2217	27.2	16.0
1.2490	29.9	5.5	1.2202	27.0	16.5
1.2480	29.8	6.0	1.2190	26.9	17.0
1.2465	29.7	6.5	1.2177	26.8	17.5
1.2455	29.6	7.0	1.2165	26.7	18.0
1.2440	29.5	7.5	1.2150	26.5	18 5
1.2427	29.3	8.0	1.2137	26.4	19.0
1.2412	29.2	8.5	1.2125	26.3	19.5
1.2400	29.0	9.0	1.2112	26.2	20.0
1.2390	28.9	9.5	1.2100	26.0	20.5
1.2375	28 8	10.0	1.2085	25.9	21.0
1.2362	28.7	10.5			

When the glycerin does not contain much impurity it may be determined direct as

Nitroglycerin, as follows: Thirty grains of the glycerin are mixed with 250 grams of a mixture of 1 part of colorless fuming nitric acid and 2 parts of sulphuric acid of 66° B., and the nitroglycerin so obtained is dried by filtering it through chloride of sodium and weighed. During the reaction the temperature must not exceed 30° C. (= 86° F.). 100 grams of pure anhydrous glycerin yield 194 grams of nitroglycerin. Zeitschr. Anal. Ch., Nos. 3 and 4, 1875, p. 391; from Monit. Scientif.

T. A. Cheatham has examined five commercial samples of glycerin by the method pursued by Prof. J. P. Remington, as detailed in his papers to this Association, and gives his results in A. J. Ph., Aug. 1875, pp. 344–5. The experimenter offers some gratuitous praise of one of the samples, which does not seem to be justified by the experiments as detailed.

Crystallized Glycerin.—Dr. Paul F. Van Hamel Roos has had opportunity of experimenting on crystallized glycerin, and finds that only glycerin of the highest degree of purity can be crystallized. If glycerin contains as much as one-tenth per cent. of water, the solidification is impossible. When chemically pure and perfectly anhydrous glycerin is melted, and afterwards exposed to a temperature of 30° F., the smallest crystal of crystallized glycerin transforms the liquid again into a solid state, and at 24° F. this transformation takes place without the introduction of a crystal, simply vigorous stirring being necessary. The specific gravity of this glycerin is at its melting-point (60° F.), 1.261. In contradiction to the results of Reichenbacher, who had obtained propionic acid as one of the results of its fermentation, the author finds that when this pure glycerin is mixed with yeast and exposed to a temperature of 70° to 80° F., no fermentation results, even after two or three weeks' contact. Ch. N., Feb. 11th, 1876, p. 57.

A. Henninger succeeded to obtain crystallized glycerin by distilling glycerin in a partial vacuum, placing in it a few traces of solid glycerin, and cooling with ice-water. The crystallization takes place very slowly, hours being required to solidify a few hundred grams. If the temperature is reduced below 0° C. (= 32° F.), the crystallization takes place slower, owing to the increased viscosity of the glycerin; at —20° C. pure glycerin loses its fluidity almost completely. The crystalline form is rhombic, as has been already determined by V. v. Lang. Ch. C. Bl., No. 33, 1875, p. 515.

Glycol.—Preparation.—A. Zeller and G. Hüfner have found an extremely simple method for the preparation of this alcohol. A molecule of bromide of ethylen is heated with a molecule of carbonate of potassium and water, in excess of the quantity required for solution, in a flask provided with a reversed condenser, to boiling. When the reaction is ended, the warm liquid is poured into a capsule, and carefully evaporated to crystallization. The crystalline mass, when cool, is transferred to a filter, and, by the aid of a Bunsen's pump, is exhausted with alcohol, which dissolves the glycol. The pure glycol is then obtained by fractional distillation. The results very materially exceed those obtained by all other methods. Arch. Ph., Feb. 1876, p. 162; J. Pract. Chem., 1875, p. 229.

Fluorenic Alcohol.—Barbier describes fluorenic alcohol ($C_{26}H_8H_2O_2$), which he obtained by acting upon dephenylen carbonyl in alcoholic solution, with sodium amalgam. The author has also obtained and describes fluorenic ether ($C_{26}H_8(C_{26}H_{10}O_2)$), and fluoren-acetic ether ($C_{26}H_8(C_4H_4O_4)$). Ch. N., July 2d, 1875, p. 8; from Comp. Rend., No. 22, 1875.

FIXED OILS.

Fixed Oils.—Detection of Adulteration by Means of the Spectroscope.—G. Gilmour has determined that the spectroscope may be rendered available to the detection of adulteration and determination of identity of fixed oils. He found that each oil subjected to examination not only gave a spectrum in some respect or another quite characteristic, but that from the nature of the spectrum which each yielded, all the fixed oils might conveniently be divided into two great classes, namely, bandgiving and non-bandgiving. Olive, linseed, sesame, and rape oil produce bands, while castor, almond, and cod-liver oils give no bands. On mixing the latter, however, with even a minute quantity of any of the bandgiving oils, their presence is indicated at once, not only by the bands, but also by the action on the extremes of the spectrum. The addition of a non-banding to a bandgiving oil is also very readily detected. The author's paper is accompanied by illustrations of the spectra of the various oils under consideration. Ph. J. Trans., June 10th, 1876, p. 981.

Determination of Free Acids.—Burstynn communicates the following method: Into a test-glass with a foot, and fitted with a ground-glass stopper, pour equal measures of the oil and of alcohol, at 88 to 90 per cent. Stopper, shake well, and allow to stand. After two or three days the alcohol forms a perfectly clear supernatant stratum, containing the free fatty acids and a little oil. 25 c.c. of this alcoholic solution is treated with a little solution of turmeric, and then titrated with normal solution of caustic potassa. The number of c.c. of the solution of potassa employed, multiplied by 4, shows how much of the alkaline liquid is required to neutralize the free acid in 100 c.c. of the oil. As the acidity of the oil is due not to one acid, but to a mixture, the result thus obtained cannot be calculated into weight. The number found, however, enables one to calculate what weight of any of the acids present is equivalent to the total acidity of the mixture. Ch. N., March 17th, 1876, p. 117; from Monit. Scientifique, Feb. 1876.

Action of Peroxide of Hydrogen.—S. Cohné finds that the reaction of peroxide of hydrogen on drying and non-drying oils may be made available for the detection of the former in the latter. When a few drops of a weak solution of HO_2 are mixed and shaken with a drying oil, such, for instance, as linseed, nut, cottonseed, poppy, etc., linolic or palmitic acid is immediately separated from it; linolic acid subsiding in the form of a greasy mass, whilst palmitic acid sets in fine sheets on the surface, and the remaining oil becomes a non-drying oil. Non-drying oils are not affected by HO_2; hence, if, for instance, olive oil is adulterated with cottonseed oil, the latter is detected by the oil becoming thick and dull, and this occurs even with less than a quarter per cent. of adulterant. An incidental advantage of the reaction is the ready conversion of a drying oil into a non-drying oil, which may then be used as a lubricant. Ch. N., March 31st, 1876, p. 133.

Neutral Fats.—The complete decomposition of neutral fats with sulphuric acid, and without subsequent distillation, had hitherto not been accomplished. J. C. S. Bock has now devised a method by which the decomposition without distillation is not only complete, but the resulting acids are also obtained in a pure white condition, and of a higher melting-point by 3–4° C. The method consists in,

1. Rational acidification, to carbonize the cellular tissue, and to make it permeable.

2. Splitting the fats deprived of their cellular envelope by means of dilute acids, under a pressure of 3–4 atmospheres.

3. Removal of the charred envelope which would color the fatty acids, by boiling with permanganate of potassium and subsequent washing.

The yield is nearly the theoretical quantity; the glycerin is very handsome, and there is no loss; and the stearic acid has a melting-point between 58° and 60° C. (= 136.4° and 140° F.) Ch. C. Bl., No. 27, 1875, p. 426; Compt. Rend., 80, p. 1142.

During the decomposition of neutral fats by superheated steam in the stearin factory of Fournier at Marseilles, a considerable quantity of volatile oily products were obtained, and these were examined by A. Cahours and E. Demarçay. They proved to be a mixture of the hydrids of amyl, hexyl (caproyl), heptyl, octyl, nonyl, decyl, undecyl, and duodecyl, all of which were separated by fractional distillation, and identified by their physical and chemical properties. At a temperature of 280° C. (= 536° F.), a small quantity of a fluid was obtained, which seems to be hydrid of cetyl. Ch. C. Bl., No. 31, 1875, p. 482; Compt. Rend., 80, p. 1568.

Stearic Acid.—Decomposition by Distillation under Pressure.—It has been stated by Heintz, Chevreul, and others, that stearic acid may be distilled under atmospheric pressure with little alteration, and Berthelot has observed that stearic acid, when heated in a sealed tube to 300°–330° C. (= 572°–628° F.), does not alter either in appearance or melting-point, nor give off either gas or water. George Johnston has taken up the subject, and has found that when the stearic acid is repeatedly distilled in a sealed tube, instead of simply heating it as Berthelot has done, it is completely decomposed into hydrocarbons of the $C_nH_{2n}+_2$ and C_nH_{2n} series, water, and carbon dioxide. If the tube is heated and placed in such a position that the distillate flows back, the melting-point is but little lowered, and no decomposition takes place. Distillation under pressure is highly favorable to the decomposition; for, if the gas which is formed is allowed to escape now and then (by a suitable arrangement of the apparatus as described by the author), the decomposition proceeds but slowly. The products of the decomposition, besides the water and carbon dioxide, obtained by the author from stearic acid, were the following paraffins and corresponding olefins, produced in about equal proportion:

Paraffins.	Olefins.
C_9H_{20}	C_9H_{18}
$C_{10}H_{22}$	$C_{10}H_{20}$
$C_{11}H_{24}$	$C_{11}H_{22}$
$C_{12}H_{26}$	$C_{12}H_{24}$
$C_{13}H_{28}$	$C_{13}H_{26}$
$C_{14}H_{30}$	$C_{14}H_{28}$
$C_{15}H_{32}$	$C_{15}H_{30}$

The author explains the decomposition by assuming that when stearic acid is vaporized at a sufficiently high temperature, it is decomposed, and if the vapor is then suddenly cooled, the reunion of the products is prevented; if on the other hand the cooling be gradual, recombination takes place, and hence the difference between the action of simply heating and distilling at the same high temperature in sealed vessels. J. Chem. Soc., January, 1876, pp. 8–12.

Soap.—The direct formation of soda soap from common salt is effected by T. N. Whitelaw, who finds that $\frac{9}{10}$ths of the soap formed is soda soap, and the remaining $\frac{1}{10}$th ammonia soap. When a fatty or resinous body commonly used in soapmaking is heated with excess of ammonia, common salt, and water, soda soap forms and separates, while the solution contains the excess of ammonia, of common salt, and chloride of ammonium. The reaction depends upon the ready solubility of ammonia soap in water containing ammonia, and the insolubility of soda soap in water containing more than 0.5 per cent. of chloride of sodium. The ammonia combines first with the fatty acid, but immediately exchanges with the sodium of the common salt. 100 parts of fatty matter require from 15 to 20 parts of NH_3, 20 to 30 parts of salt, and 200 to 300 parts of water. Resin soap, formed in the same way, contain almost the full quantity of soda. The author considers that the process might, practically, be of some value, since the alkali would be considerably cheaper than by present methods, even allowing 5 per cent. of loss of ammonia; while there would be a saving of salt, and the labor and fuel of alkali making. On the other hand the process has the same difficulty to contend with as that for the conversion of common salt into carbonate of sodium with the aid of ammonia; but the chance of losing ammonia would be much less. Ch. N., September 24th, 1875, p. 152.

Castor Oil.—A New Test of Purity.—Hager recommends petroleum benzin as a test of the purity of castor oil, which is based on the sparing solubility of the latter in the hydrocarbon. Petroleum ether or benzol will also answer. If 1 volume of castor oil is agitated with 2 volumes of benzin and then set aside, two layers are formed after several hours' standing, the lower one being increased at 16° C. (= 60.8° F.) to 1.6 of the original volume, while at 10° C. (= 50° F.), it is increased to 1.75. A certain portion of the benzin is dissolved by the castor oil, while a much smaller portion (about $\frac{1}{30}$th) of the castor oil dissolves in the benzin. If the castor oil, however, is adulterated with other fixed oils, a clear solution may form, or, if two layers are formed, the lower layer will be less than 1.5 times the original volume. Taking the increase in volume when operating with pure castor oil at 1.5, if the oil is adulterated to the amount of 10 per cent., the volume will be 1.0 to 1.2; if 25 per cent., it will be only about 0.4. Ph. Centralhalle, No. 7, 1876, p. 50.

Both the German and the Austrian Pharmacopœias state that castor oil mixes in all proportions with the alcohol officinal in these standards. Such alcohol, however, contains but 90 per cent. of absolute alcohol, and Hager finds that castor oil will mix in all proportions with 90 per cent. alcohol only at a temperature of 26° C. (= 78.8° F.). If the temperature is reduced to 20° C. (= 68° F.) the mixture becomes turbid, and at 16° C. (= 60.8° F.) it separates in two layers. A portion of alcohol remains dissolved in the castor oil, and this fact may be advantageously applied to the detection of adulteration by other oils. For if an adulterated oil is agitated with twice its volume of 90 per cent. alcohol at a temperature of about 30° C. (= 86° F.), the mixture will separate on cooling into three layers, of which the lower is the adulterant. While castor oil is specifically one of the heaviest fixed oils, the alcohol dissolved under these circumstances renders it lighter, and hence the foreign oil separates to the bottom. The separation of castor oil from admixture with a foreign oil may thus be accomplished very readily, for the latter does not appear to become more soluble in 90 per cent. alcohol when in admixture with castor oil than it is in the pure state. Ph. Centr. Halle, No. 8, 1876, p. 65.

Croton Oil.—It has been contended that the bright and transparent croton oil of commerce is not as effective as the turbid oil formerly found in commerce. Kühn states that this is contrary to his experience. He has for many years prepared the croton oil used in his shop by depriving the seeds of their outer coating, breaking up the kernels and expressing cold. The filtered oil obtained in this way has the yellow color of an almond oil, keeps perfectly clear for years, and is in the highest degree active. 750 parts of seed yield 500 parts kernels, and these 200 parts oil of the above characters. It is scarcely probable that an oil obtained by warm expression or by extraction with ether, should possess greater activity; although the yield is greater. Ch. and Drug., July, 1875, p. 218.

Mustard Oil.—R. Rother finds in fixed oil of mustard seed an excellent substitute for olive oil, lard, and other fats in cerates, ointments, liniments, etc. It not only replaces these perfectly, but imparts to these preparations greater stability, since it appears to be insusceptible to rancidification. The Pharmacist, April, 1876, p. 97.

Chaulmogra (*Gynocardia*) *Oil.*—Mr. W. Dymock has made some experiments with a view to the discovery of some ready test for the admixture of other oils with *chaulmogra oil*, the adulteration of which is practiced to a considerable extent by the native druggists of India. Two samples of oil were prepared from the seeds; the first cold-drawn, the second by boiling the powdered seeds in water. The cold-drawn oil was of a pale sherry color; after standing a few days it became quite clear, a scanty and black deposit forming, and remained clear for nearly two months, when a granular white fatty deposit formed, but not very abundantly. Its sp. gr. was 0.900. Twenty minims placed on a watch-glass and one minim of strong sulphuric acid, B. P., added, produced on stirring with a glass-rod, a bulky, tenacious, resinous mass, of reddish-brown color, around the drop of acid, and the oil, after having been stirred a few minutes, turned of a rich olive-green color, the resinous portion all the time remaining separate and retaining its color and transparency. The oil obtained by boiling was accompanied by a quantity of brown resin, which, when separated, left the oil of a golden sherry color. The addition of the drop of acid to twenty minims of the oil, and stirring, turned its color to that of burnt sienna, and after a few minutes stirring, to a rich olive-green. The tenacious resinous mass was not formed as in the cold-drawn oil; its formation therefore appears to depend on the presence of the resin of the seed, which is separated during clarification when the oil is prepared by boiling. The author gives a tabulated statement of the action of sulphuric acid upon commercial oils, from which it appears possible to detect the admixture of the pure oil with others. Several of the common cheap oils likely to be used as adulterants were tested by sulphuric acid with the following result: Groundnut oil turned light-brown; cocoanut oil, opaque white; castor oil, dirty white; sesame oil, pale dirty green; linseed oil, dirty greenish-brown, bulky tenacious brown resinous mass also formed; several animal fats turned different shades of brown. The oil of *Hydrocarpus Wightiana* has an odor resembling chaulmogra, but more acrid. Its color is greenish, and it forms when long kept a white fatty matter like that of chaulmogra.

With sulphuric acid the cold-drawn oil also forms a resinous mass, but the color of the oil subsequently is of a light green. With the boiled oil a sienna color, followed by light green, is formed. The seeds of *Hydrocarpus*, however, cannot be mistaken for those of *Gynocardia.* Ph. J. Trans., March 25th, 1876, p. 761.

Beech Wax.—F. A. Flückiger draws attention to the wax-like exudation observed on beech trees, which is formed by insects. It gives up to bisulphide of carbon about one-third of its weight of a wax crystallizing in white laminæ, melting at 81° to 82° C. (= 177.8° to 179.6° F.), and having the composition of cerotic acid. Unlike the latter, however, its alcoholic solution does not redden litmus, nor is it attacked by prolonged boiling with aqueous or alcoholic solution of potash. A. J. Ph., June, 1876, p. 278.

CARBOHYDRATES.

Hydrocellulose.—Between normal cellulose and the modified gelatinous form of cellulose, which Béchamp noticed in 1856, a third form of cellulose has been noticed by A. Girard, who has subjected this form to examination, and finding it to contain 1 mol. of water in addition to the elements of ordinary cellulose, has named this modification *hydrocellulose.* During various industrial operations, it is a common occurrence that cellulose loses its compact character and becomes friable. With proper care and an observance of certain conditions this friable variety of cellulose may be produced directly. The author finds the following the best method: The cellulose is moistened and then immersed in cold sulphuric acid of 45° B., the time for the continuance of such immersion depending on the permeability of the substance. With pure carded cotton it requires about twelve hours, after which it is washed and dried. The cotton so treated has the appearance of unchanged cotton, but when pressed between two plates of glass is immediately reduced into innumerable small fragments, and may be rubbed between the fingers into a fine snow-white powder. It is, furthermore, characterized by the rapidity with which it is oxidized; exposed for several days to a temperature of 50° C. (= 122° F.) it becomes yellow, and if then washed with water this will dissolve a considerable portion, and the solution formed reduces copper and silver solutions; the undissolved residue is unchanged hydrocellulose, corresponding to the formula $C_{12}H_{11}O_{11}$. The conversion of ordinary into hydrocellulose may also be effected by exposing the substance moistened with weak acid, to a temperature of 100° C. (= 212° F.).

If the acid is allowed to act for a long time the cellulose is completely carbonized. Ph. Centr. Halle, No. 20, 1876, p. 170.

Starches.—Microscopical Examination.—Mark W. Harrington contributes an interesting paper on "Powdered Drugs under the Microscope," which is intended to draw more general attention to the use of the microscope for the identification of vegetable substances and adulterations in vegetable powders. The author draws attention to the rapidity and ease with which vegetable substances or their admixtures are so identified, and the superiority of the microscope over the methods of chemical analysis as applied to such substances, the latter method being often quite unsatisfactory. In the present paper he draws attention particularly to the starches. Under the microscope the starch-grains present the form of minute grains, of a form and structure characteristic for each species. They are usually bounded by curved surfaces—spherical, elliptical, egg-shaped, lens-shaped, etc.—but sometimes they have flat surfaces as well. They usually contain a dark spot, line, or cross within, which is sometimes central, sometimes eccentric. This spot is called the nucleus, and is usually small and round in starch found in fresh tissues, slit or cross-shaped in grains which have been dried (Fig. 36). The position and character of the nucleus affords a valuable means of describing the grains. The grains, also, frequently show a series of rather faint lines concentric about the nucleus. When present they sometimes can be distinguished only with careful focussing and close examination, and in many starches they are entirely absent. Sometimes the grains have more than one nucleus (Fig. 36 *a*), in which case they are said to be compound. The compound grains may consist of only two simple ones, as in tapioca, or three, as usually in sago, or of a great many, as in rice, oat, and buckwheat.

1. *Potato-starch* (Fig. 36).—The ease of obtaining it and the size of the grains make it the best and most convenient form for the inexperienced microscopist to begin with. It is also important to the pharmacist, because frequently named as an adulterant of other powders. Under the microscope the grains are found to vary much in size, due probably to unequal development, the youngest being smallest, while the largest are about $\frac{50}{10000}$ths of an inch in length. The form is usually oval, egg-shaped, elliptical, or round-triangular. The smallest and youngest grains are nearly spherical. The nucleus is near the smaller end. The distance from it to the smaller

end is usually $\frac{1}{4}$ to $\frac{1}{6}$ of that to the larger end. The grains are almost invariably simple, but occasionally one with two nuclei is found (Fig. 36 *a*), and very rarely one with three nuclei.

FIG. 36.

2. *Tapioca* (Fig. 37).—The grains are usually compound, the two, sometimes three or four, grainlets of which are generally separated from each other in the preparation of the article for market. The grainlets differ considerably with the direction from which they are viewed. From the side they appear rounded at one end, cut

FIG. 37.

FIG. 38.

off at the other, and contain an apparently conical cavity, of which the nucleus is the apex and the flat side of the grain the base. Seen from the end, the grain appears circular, with a round, central nucleus. The layers are not distinct, though sometimes one or two can be made out. The diameter of the grains varies from 1 to

$\frac{16}{10000}$ths of an inch. In the tapioca of the markets the grains of starch are distorted, more or less, by the heat used in its preparation; but a careful examination will show many grains of the original form.

3. *Sago* (Fig. 38).—The grains are ovate or oval, with the margins sometimes slightly concave. The rings are evident, and there is a round or star-shaped nucleus nearest the largest end. Many of the grains are singularly compound, consisting of a large grain, with one or more smaller ones forming protuberances on it. In commercial specimens the grainlets of the compound grains are usually separated from each other, and show only the flattened surfaces where they were in contact. The length of the grains is from $\frac{7}{10000}$ to $\frac{24}{10000}$ths, usually above $\frac{14}{10000}$ths of an inch. In granulated sago of commerce the starch-grains are but little altered by heat; in pearl sago they are swollen and distorted, and the nucleus is bulging.

4. *Arrowroot* (Fig. 39).—The grains are simple, egg-shaped or oblong. The rings are fine and concentric or eccentric. The nucleus is large, shaped like a point, or a slit covering the grain, or two slits crossing each other. It is in the centre, or nearer the larger end of the grain. The length of the grain is from $\frac{1}{10000}$th to $\frac{24}{10000}$ths of an inch.

FIG 39.

Curcuma Arrowroot is known by starch-grains which are rather larger than those of maranta, and which have the nucleus on the margin of the grain, frequently on a projecting point.

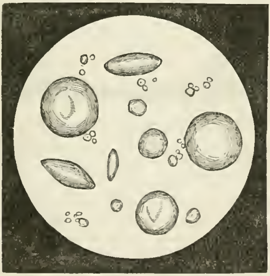
Canna Arrowroot, or *tous le mois*, consists of starch-grains from $\frac{16}{10000}$ths to $\frac{50}{10000}$ths of an inch in length; the larger grains are flat, more or less egg-shaped, with the nucleus near the smaller end; the concentric lines are fine, regular, and very numerous.

Tacca or *Tahiti Arrowroot* consists of grains $\frac{4}{10000}$ths to $\frac{15}{10000}$ths of an inch long, and shaped much like the grains of sago starch. They are partly convex, partly with flat surfaces, rather hemispherical or pear-shaped. The nucleus is nearly central and star-shaped.

Arum or *Portland Arrowroot* consists of very minute grains, something like those of Tacca, but only $\frac{1}{10000}$th to $\frac{8}{10000}$ths of an inch long.

5. *Wheat Starch* (Fig. 40).—The grains are of two sizes with but few intermediate. The larger ones are lens-shaped, and present only indistinct traces, if any, of nucleus and rings. When these do appear, the former is central, the latter concentric. They are from $\frac{14}{10000}$ths to $\frac{16}{10000}$ths of an inch in diameter. The smaller grains are spherical, and usually much less than $\frac{3}{10000}$ths of an inch in diameter.

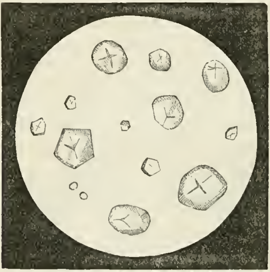
Fig. 40.



Rye and Barley Starch-grains are much like those of wheat. In *rye* the larger grains are from $\frac{16}{10000}$ths to $\frac{21}{10000}$ths of an inch in diameter, and have frequently a distinct star-shaped nucleus, while the smaller are decidedly smaller than those of wheat. In *barley* the larger grains are about $\frac{11}{10000}$ths of an inch in diameter, with often rings and nucleus, while the smaller grains correspond closely to those of wheat.

6. *Corn Starch* (Fig. 41).—The grains are quite small, not surpassing $\frac{12}{10000}$ths of an inch in diameter, and usually lying between $\frac{6}{10000}$ths and $\frac{9}{10000}$ths of an inch. They are simple; the general

FIG. 41.



shape is spherical, but the sides are more or less flattened, and the grains misshapen by mutual pressure. In the starch from the central white and mealy part of the kernel of corn the grains have more flat sides, due to the greater pressure, while in the more hyaline outer part of the kernel the starch-grains are rounder. There are no visible rings. The nucleus is central, and is a round point in the fresh grain, star-shaped in that which has been dried.

For the foregoing experiments an instrument with a magnifying power of 200 to 300 diameters will answer. One of the cheaper compound microscopes, with an inch objective, and provided also with a half or quarter inch objective, will serve very well. Instruction concerning the use of the microscope must be looked for in books devoted to that subject. The illustrations, with the exception of Figs. 37 and 38 are drawn from nature by Louisa M. Reed, of Ann Arbor, Mich., and are careful and accurate representations, as can be tested by comparison with the actual objects. A. J. Ph., 1876, pp. 241 to 246, and 296 to 300.

In connection with the above paper, a paper by Mr. Henry Pocklington, on "Some Practical Applications of Polarized Light," may be mentioned. Unfortunately this very valuable and comprehensive paper is not suited for extraction, and reference is therefore made only to that portion relating to the application of polarized light to the microscopic examination of starches, this portion being contained in "Ph. Jour. Trans.," February 19th and March 18th, 1876. The polarization phenomena of starches are far more numerous and much more interesting than many microscopists appear to know, and by no means comprised in those described in text-books. The author refers, in this portion of his paper, specially to the phenomena observed in canna, Natal, cassava, pea, and rice starch, and illustrates his observations by suitable engravings.

Action of Diastas.—A. Petit finds that if, at a constant temperature of 50° C. (= 122° F.), a gram of diastas is allowed to act for some hours upon a kilogram of starch paste at $\frac{1}{10}$th, the liquid, after filtration and prolonged ebullition—in order to stop the action of the diastas—contains, besides matters capable of fermentation and of reducing Fehling's liquid, another fermentable sugar, which has no action on Fehling's liquid, even after ebullition for five minutes in contact with sulphuric acid at $\frac{1}{100}$th. Ch. N., January 7th, 1876, p. 10; from Bull. Soc. Chim. de Paris, December 5th, 1875.

Dextrin.—New Process of Manufacture.—At present fecula, in the separate state, is exclusively employed in the preparation of dextrin, all that portion being wasted which is retained by the fibrous part of the potato or of the bran. Anthon recommends, in order to prevent this loss, that the entire potato be dried and ground after being freed from its soluble principles by washing in acidulated or alkaline water. The fecula thus obtained is sprinkled with hydro-fluosilicic acid (0.5 to 1 per cent. of the weight of the fecula); it is then placed in a drying-room at 38° to 44° C. (= 100.4° to 111.2° F.) till there is no further loss of weight; the temperature is then raised to 70° to 75° C. (= 158° to 167° F.) till no loss occurs, and finally to 90° C. (= 194° F.). The derivation being thus complete, the fecula, while still hot, is placed in large sheet-iron troughs, which are introduced into large stoves heated to 100° to 125° C. (= 212° to 257° F.). The transformation into dextrin is known to be complete when a sample taken out, on being cooled and moistened with water, adheres together in little glassy globules. Chem. N., June 23d, 1876, p. 260; from Bull. de la Soc. Chim., May 20th, 1876.

Arabin.—C. Barfoed has repeated the experiments made in 1854 by Neubauer, and finds the statements then made by the latter in the main correct. It possesses, when precipitated by alcohol from acidulated aqueous solution and purified, a distinct acid reaction, is not completely precipitable by alcohol except from acid solution, and when it has assumed the insoluble form (metagummic acid) is soluble in alkaline solution. His results conflict, however, with those of Neubauer in regard to the formation of the insoluble modification, which is generally stated to result when the precipitated arabin has been dried. Barfoed finds that this modification may result while the arabin is still in a moist condition, and does not always take place when it has been dried. He finds that this is owing to the manipulation pursued. Thus the insoluble modification is more readily formed when the gum has been previously in a dry state, and it forms with more or less difficulty when it has been allowed to stand for a long time in solution, or has been heated in that condition for some time previous to treatment with acid and alcohol, etc. Under the latter condition the arabin requires to be heated to 130° C. (= 266° F.) in order to convert it into metagummic acid. Ch. C. Bl., No. 25, 1875, p. 390.

Pararabin.—C. Scheibler obtained, several years ago, from the sugar beet, a substance which proved to be identical with arabin or arabinic acid (see Proceedings, 1874, p. 245). Prof. E. Reichardt has since obtained results which confirm Scheibler's results as regards arabic acid in the sugar beet, but he obtained in addition an indifferent body which, from its close relation to arabic acid, he has called pararabin. It was obtained, as is the arabic acid, from the press cake (cellular tissue) of the beet remaining after expressing the juice. The press cake was completely exhausted by water, and then by alcohol, after which it was digested for several hours in dilute hydrochloric acid, heated to boiling, and strained. The solution so obtained yielded, upon the addition of alcohol, a gelatinous (to flaky gelatinous) precipitate, which, when thoroughly washed with alcohol and dried at 100° C. (= 212° F.), constitutes the new substance.

Pararabin is swelled up by water, and becomes soluble on addition of an acid and heating. It is precipitated from such solutions by alcohol and by alkalies, and is not convertible into sugar by heating with acids. It is a neutral and, consequently, indifferent body, but is convertible into arabic acid by long-continued action of alkalies. Its neutrality, its solubility in acids and precipitation from such solutions by alkalies, and the circumstance that it is not convertible into glucose by the action of acids, readily distinguish it from arabic acid, which possesses just the opposite properties. The relative proportions of the two substances in the cellular tissue of the beet-root were determined to be 38.5 per cent. of arabic acid and 54.0 per cent. of pararabin; together 92.5 per cent. of the perfectly washed and dried press cake. The author found that the peculiar Chinese vegetable jelly,

Agar Agar, which is now abundantly to be found in commerce, is likewise pararabin, with which at least it possesses identical properties. Ph. Centr. H., No. 40, 1875, p. 337.

Vegetable Mucilage.—W. Kirchner and B. Tollens, after a critical review of the various investigations that have been made with this subject, describe their process for the purification of the mucilage, which is similar to Schmidt's, as follows: The mucilage, after the addition of hydrochloric acid, is precipitated by alcohol, and, when the operation has been repeated six or eight times, the product is repeatedly washed with absolute alcohol, and finally with ether. By this means the ash is reduced to a minimum, and the mucilage when dried is obtained in a porous mass.

Quince Mucilage, thus purified, is grayish-white, and when soaked in water swells up to a gelatinous mass, forming a mucilaginous solution only on the addition of a small quantity of hydrate of potassium. Its composition corresponds to the formula $C_{18}H_{28}O_{14}$ $(O = 16)$, but it still contains 4 to 5 per cent. of mineral matter. By the action of boiling dilute sulphuric acid it is converted into soluble gum, or dextrose, and sugar, and a flocculent precipitate of cellulose is formed. The gum polarizes lævorotary; the sugar reduces cupric solution, and is dextrorotary.

Linseed Mucilage gave numbers corresponding to the formula $C_6H_{10}O_5$ $(O = 16)$. When boiled with dilute sulphuric acid it decomposes like quince mucilage, but with greater difficulty, while the insoluble residue (cellulose ?) is much smaller (about 4 per cent.).

Fleabane Mucilage has the formula $C_{36}H_{58}O_{29}$, and it decomposes like the other mucilages when boiled with acid, with this difference, that by long-continued boiling the gum is completely converted into dextrorotary sugar.

The authors infer from their results that in quince mucilage the cellulose exists in combination with gum, in the ratio of one of the former to two of the latter. The constitution of the other two mucilages has not been determined. A. J. Ph., January, 1876, p. 35; from J. Ch. Soc., November, 1875.

Sugar.—Durin observes that in the commercial analysis of sugars it is not sufficient to determine the mere quantity of pure sugar present. It is needful also to know the amount of certain foreign bodies which have the power of interfering with the crystallization of sugar in the process of refining. Salts are said to hinder crystallization to the extent of four or five times their weight. Glucose has been considered as obstructive to crystallization (to the amount of 2 per cent.), but this he finds not to be the case. Crystallizable salts do not interfere with the formation of sugar; nevertheless, the assumption that each part of saline matter will hinder the crystallization of 4 parts of sugar, though it is founded on a theoretical error, gives results satisfactory in industrial practice. The formation of treacle is due to organic matters and deliquescent salts in the juice of the cane and the beet. Ch. N., November 5th, 1875, p. 226; from Comp. Rend., October 11th, 1875.

Beet-root Sugar.—It has been shown by Durin that the quality of beet-root is in inverse ratio to the bulk of the crop, and that, therefore, the interests of the grower who expends azotized manures in order to obtain an abundant crop, are opposed to those of the manufacturer who wishes to operate upon a rich article only. Durin proposes to fix the value of the roots in accordance with the density of the juice. Ch. N., August 27th, 1875, p. 101; from Comp. Rend., August 2d, 1875.

Glucose.—Modification of Fehling's and Barreswill's Test Solutions.—P. Lagrange proposes the following formula: Dry neutral tartrate of copper, 10 grams; pure caustic soda, 400 grams; distilled water, 500 c.c. The tartrate of copper is obtained by decomposing sulphate of copper with neutral tartrate of sodium, washing the precipitate by decantation, and drying it at 100° C. (= 212° F.). This test liquid is not affected by light. Ch. News, July 9th, 1875, p. 20; from Monit. Scient., June, 1875.

Formation in Fruits.—Mercadante finds that in the first period of their existence fruits behave like leaves, decomposing carbonic acid under the influence of the sun's rays, and giving off oxygen. In the second period they absorb oxygen and give off carbonic acid. In the third the sugar which they contain passes into alcoholic fermentation. On the 20th of May the author began to determine the acidity and the sugar in the green plums, and, continuing the analysis, he found the acidity to increase very sensibly until carbonic acid began to be given off by day, when the maximum acidity (2.76 per cent. malic acid) was reached. The sugar is formed from the prolonged action of the malic acid upon the gummy matter, which in the earlier analyses amounted to 6.21 per cent. of the pulp, but gradually became reduced to 3.34 per cent., and remained nearly constant, 3.27 per cent. being found at the date of the last analysis. The malic acid, however, became reduced in quantity, while the sugar correspondingly increased after its formation from the gummy matter had ceased, and the author consequently infers that the acids themselves are transformed into sugar. The following table shows the successive changes in the amounts of sugar and malic acid, after the maximum amount of the latter had been reached:

June 20, ...	Sugar, 16.52	Malic Acid, 2.76
" 24, ...	" 16.64	" " 2.46
" 30, ...	" 16.78	" " 2.16
July 4, ...	" 17.048	" " 1.57
" 12, ...	" 17.38	" " .82

Ch. N., July 9th, 1875, p. 19; from Gaz. Chim. Italiana, 1875, No. 3.

Neubauer recommends Schwarz's method for the preparation of chemically pure glucose, which he has modified as follows: 500 to 600 c.c. of alcohol of 80 per cent. are mixed with 30 to 40 c.c. of fuming nitric acid, and to the mixture pure and finely powdered cane sugar is added in small portions until, after shaking, it is no longer dissolved; the clear liquid is then decanted from any excess of sugar that may have been added, and is allowed to stand in a well-stoppered glass vessel until glucose, which soon forms in the mixture, no longer crystallizes out. The crystallized glucose is collected on a filter, washed with alcohol until the acid is completely removed, and recrystallized once from boiling absolute alcohol. Ph. Centr. Halle, June 22d, 1876, p. 219.

Maltose.—The recent statement of O'Sullivan, that by the action of infusion of malt upon starch a peculiar sugar, maltose, and not glucose is formed, has induced E. Schulze to repeat the experiments, and he has obtained results which prove the correctness of O'Sullivan's views. Maltose has the empirical formula of $C_{12}H_{22}O_{11}$ ($O = 16$). It reduces Fehling's solution in entirely different proportions to glucose, and possesses a much greater rotation power; but it is convertible into glucose by boiling with dilute acids. Arch. Ph., July, 1875, p. 64; from Ber. d. Ch. Ges.

A New Starch Sugar has been observed by A. Petit. He finds that when 1 gram of diastas is allowed to act upon 1 kilogram of starch-paste (containing 10 per cent. of starch) for one hour, and the liquid is then filtered and boiled for some time to prevent the further action of the diastas, a new variety of sugar is formed along with the maltose, which, while it readily undergoes alcoholic fermentation, fails to reduce Fehling's solution, even if it has previously been boiled for five minutes with 1 per cent. of sulphuric acid. It amounts to about $\frac{3}{4}$ of the quantity of maltose produced. Ch. Central. Bl., No. 6, 1876, p. 83; from Bull. Soc. Chim. Par.

Galactose.—H. Fudakowski has observed, that when milk-sugar is boiled with dilute sulphuric acid, it takes up a molecule of water and is resolved into two sugars, having the same composition. One of these yields mucic acid when treated by Limpricht's process, and is the substance from which lactonic acid is formed; to it the term "galactose" might be applied. The other is grape-sugar, yielding gluconic acid by treatment with chlorine, according to the method of Hlasiwetz and Habermann. The author continues his investigations. Jour. Ch. Soc., May, 1876, p. 697; from Deut. Ch. Ger. Ber., IX.

ORGANIC ACIDS.

Formic Acid.—Lorin, in continuation of the experiments detailed in a former paper (see Report, 1874, p. 250), communicates some observations since made in Compt. Rendus (81,270). Operating with *glycerin* and oxalic acid in the manner and proportions given in his former paper, the author obtained nearly the theoretical quantity ($\frac{23.004}{23.639}$) the oxalic acid is capable of yielding in form of a 54.5 per cent. acid. *Mannit* seems to be specially adapted to the production of a 56 per cent. acid; and by employing anhydrous oxalic acid he succeeded to obtain an acid of 86.4 per cent., which upon distillation was concentrated to 90 per cent. With *Erythrit* the author succeeded to decompose anhydrous oxalic acid so as to form an 87.5 per cent. acid, which by distillation became concentrated to 98 per cent. He has obtained *crystallized formic* acid by substituting the copper salts for the formiate of lead usually employed, and he thinks it probable that the 98 per cent. acid, obtained by the intervention of erythrit, may be made to yield it direct. Ch. C. B., 38, 1875, p. 597.

Acetic Acid.—Determination of Free Mineral Acids in Vinegar. —In the Proceedings for 1875 (p. 369) the method of C. Witz for the determination of free mineral acids in vinegar is alluded to.

This method depends on the property of methyl-anilin violet forming with mineral acids a greenish-blue color, while acetic acid does not affect its color. A. Hilger recommends the method as reliable, experiments made in his laboratory by his assistant, R. Ludwig, proving this very conclusively, but subject to the following modifications: 1. Ordinary, commercially pure vinegars, containing 2–4 per cent. acetic acid, do not change methyl-anilin violet; but the strong vinegar (*essigsprit*) changes it to violet-blue. 2. In the presence of 0.2 per cent. of sulphuric acid methyl-anilin violet is changed to blue, 0.5 per cent. of sulphuric acid to blue-green, 1 per cent. to intense green. 3. Vinegar containing 0.1 per cent. of hydrochloric acid changes the violet to blue, 0.2 per cent. to green, and if it contains 1 per cent., the color disappears altogether. The reaction does, however, not answer for the volumetric determination of the free mineral acids. Ph. Centralhalle, No. 17, 1876, p. 139.

Detection of Free Sulphuric Acid in Vinegar.—The conflicting results obtained by analysts of reports, while examining the same sample of vinegar, show the necessity for some process being devised which shall both detect and estimate free sulphuric acid in it with some degree of accuracy. For this purpose J. C. Thresh has undertaken a number of experiments, using for them a sample of vinegar which contained in each 100 c.c. 0.120 sulphuric acid and 0.0725 chlorine. He obtained satisfactory results by a method which is based upon the circumstance that when a known quantity of solution of chloride of barium is added to a solution containing sulphates and free sulphuric acid, and the solution is then evaporated and ignited, there will be a loss of chlorine equal to the amount of free sulphuric acid present. The following method seems to have given the most satisfactory results: To 50 c.c. of vinegar, 20 c.c. of solution of chloride of barium—in which the quantity of chlorine (represented by 34.134 grams chloride of barium in the litre) has been volumetrically determined with standard silver solution—are added, and the mixture is evaporated and ignited gently for some time, until it can be readily detached from the dish. The residue is then rubbed to a fine powder in a mortar, transferred to a beaker and boiled with about 150 c.c. of water, and sufficient carbonate of sodium to faint alkalinity, for ten minutes; the carbonate of sodium being added for the purpose of removing excess of barium (as chloride), which is not readily taken up by the water in the form in which it is associated with the sulphate. The solution is then filtered, the residue washed, and the filtrate and washings titrated with nitrate of silver, neutral chromate of potassium being used as indicator. With an error of but 0.002 to 0.004 per cent. the process will readily determine 0.1 per cent. of free sulphuric acid, as shown by the tabular statement of the author's experiments, accompanying his paper. Ph. J. Trans., July 3d, 1875, p. 2.

The determination of acetic acid in presence of fixed acids and extractive matter by a direct volumetric method is accomplished with some difficulty. At 212° F. the acetic acid is not driven off from the fixed residue in the retort, and if a higher temperature is resorted to, acetic acid soon begins to be formed as a product of empyreumatic decomposition. Professor Prescott, in his work on the "Chemical Examination of Alcoholic Liquors," makes an approach toward overcoming the difficulty, by recommending large dilution of the wine or beer before evaporating for volatile acid. B. F. Craig has for a number of years pursued a method for determining the acetic acid in wines, which is a sort of amplification of that of Prof. Prescott. The evaporation is carried on in an open capsule until apparent dryness, the capsule is refilled with distilled water, the evaporation repeated, and this is repeated once more, when the separation of volatile acids may be assumed to be complete. Am. Chem., August, 1875, p. 45.

Glacial Acetic Acid.—Solubility in Oils.—In continuation of his experiments upon the solubility of alkaloids in oils by the intervention of glacial acetic acid (see Alkaloids), J. B. Barnes submits the results of experiments made to ascertain the exact proportions in which a considerable number of oils unite with glacial acetic acid.

The *minimum* combining proportions of the following five commercial samples of oil he finds to be as follows:

Almond oil,	7 vols. to	Glacial	Acetic Acid,	1 vol.
Olive oil,	8 "	"	"	1 "
Cod-liver oil,	7 "	"	"	1 "
Linseed oil,	7 "	"	"	1 "
Oil of Rhodium,	4 "	"	"	1 "

In this series the oils appear to dissolve the acid.

The *maximum* combining proportions of the next five are:

Oil of Turpentine,	1 vol. to	Glacial	Acetic Acid,	2 vols.
" Lemon,	2 vols.	"	"	1 vol.
" Lemon grass,	2 "	"	"	1 "
" Copaiba,	1 vol.	"	"	20 vols.
" Juniper,	1 "	"	"	1 vol.

In this the order is reversed, the acid dissolves the oils.

The following is a list of forty-one oils that will mix with glacial acetic acid in all proportions:

Castor, croton, cloves, caraway, rosemary, sandal, cajuput, orange, bergamot, anise, bitter almonds, origanum, chamomile, eucalyptus, sage, cinnamon, cassia, lavender, myrtle, marjoram, pennyroyal, citronella, pimenta, sassafras, calamus, spearmint, wormwood, neroli, cubebs, coriander, cumin, peppermint, geranium, male fern, citron, fennel, rue, savin, nutmeg, and essential oil of mustard. Ph. Jour. Trans., September 18th, 1875, p. 221.

Mr. W. H. Lymons has since found that some of the oils mentioned in the above paper are much more soluble in glacial acetic acid than was found by Mr. Barnes, and on investigation found that this was owing to a difference in strength of the acid used, which remained solid up to 60° F., while that employed by Mr. Barnes was that of the British Pharmacopœia (*i. e.*, solid at 48° F.). Thus 4 volumes of oil of almonds, of olive oil, of cod-liver oil, and of linseed oil, respectively require 1 volume of glacial acetic acid melting at 60° F.; while the oils of turpentine and lemon are miscible with such an acid in all proportions. On the basis of his results he suggests a modified formula for Linimentum Terebinthinæ Aceticum, B. P. Ph. J. Trans., October 16th, 1875, p. 301; see also Ibid., October 30th, p. 341.

Acid Acetate of Ammonium.—In a former paper Bertholet has described the preparation and characters of *neutral* acetate of ammonium (see Report, 1875, p. 369). He has since obtained an *acid* salt, which crystallizes in long, handsome, glistening, flattened needles, and is readily formed by the solution of the commercial acetate in its weight of glacial acetic acid. Its elementary composition corresponds very closely to the formula $3(C_4H_4O_4),2(C_4H_4O_4,H_3N),2HO$. The *commercial* acetate of ammonium seems to have the composition $= C_4H_4O_4,2(C_4H_4O_4H_3N),3HO$. The acid salt crystallizes from its solution in glacial acetic acid unchanged. Ch. Cent. Bl., 38, 1875, p. 594; Bull. Soc. Chim. Par. (N. S.), 24, p. 107.

Acetate of Lead.—According to the observation of Paul Pfund, it is important to avoid the addition of too much litharge in the preparation of acetate of lead, for the presence of a small quantity of basic acetate prevents the crystallization of the neutral salt. On the other hand acetic acid may be wasted by passing the vapors too long over the litharge. The usual method of ascertaining the point of saturation is very empirical; it consists in observing the different noises made by the acetic acid vapor while passing through the boiling water and litharge, by the smell of the hot liquid, by testing with litmus, etc. By setting aside the first two as untrustworthy, even litmus-paper does not give satisfactory results, for blue litmus appears to be reddened by lead oxide long before neutralization. The author has found a solution of 10 grams of mercuric chloride in 1 litre of water a thoroughly trustworthy test. When it is added to neutral acetate of lead, no turbidity is produced. But the presence of a trace of basic salt causes turbidity. A sample of the liquid is filtered, and an equal volume of the solution of mercuric chloride is added. The amount of basic acetate still present may be roughly estimated by the eye, according to the amount of the precipitate thrown down. Jour. Ch. Soc., May, 1876, p. 798; from Dingl. Polyt. Jour.

Biacetate of Thallium has been obtained by H. Lescœur by exposing a solution of acetate of thallium in monohydrated acetic acid to spontaneous evaporation. Its formula is $KO,C_4H_3O_3$, $C_4H_4O_4$. The salt effloresces slightly in dry air, and melts at about 64° C. (= 147.2° F.). In a similar manner

Biacetate of Lithia is obtained. It deposits, by the spontaneous evaporation of a solution of the neutral acetate in glacial acetic acid, crystals in the form of a hopper, which have a composition corresponding to that of the thallium compound. It melts at 99° C. (= 210.2° F.), and if suddenly heated in a platinum capsule it gives off vapors of monohydrated acetic acid, which take fire and burn. Ch. N., Jan. 7th, 1876, p. 10; from Bull. Soc. Chim. de Paris, Dec. 5th, 1875.

Salylic Acid.—Kolbe and Lautemenn had obtained by the reduction of *chlor-salylic* acid with sodium amalgam, an acid which they regarded to be isomeric but not identical with benzoic acid; but this view had subsequently been contradicted by Reichenbach and Beilstein. Experiments recently made by Kolbe justify the contradiction of the last-named chemist, and seem to prove that the acid compound produced under the above-named conditions is really benzoic acid, associated with a very small quantity of a substance which has the property of disguising its characters completely. This substance may be separated by subjecting the acid to distillation with water, when the foreign substance named will remain in the retort, while pure benzoic acid is contained in the distillate. The foreign principle may be more readily separated by permanganate of potassium, which destroys it, whereas the benzoic acid is not affected. Ch. C. Bl., No. 40, 1875, p. 627.

Chlordracylic Acid.—The above-mentioned experiments of Kolbe, as well as the previous experiments of Reichenbach and Beilstein, rendered it obvious that chlordracylic acid could also be made to yield benzoic acid, and this view is verified by O. Hartmann's investigations. The pure acid was suspended in hot water, sodium amalgam added, and the heating continued until all the amalgam was decomposed. The alkaline solution so produced contained an abundance of oily by-products of decomposition, and the author therefore failed to obtain pure benzoic acid by the ordinary methods of precipitation and crystallization. But upon subjecting the partially purified substance to distillation with water, the distillate yielded it in a perfectly pure condition. Ch. C. Bl., No. 40, 1875, p. 627.

Salicylic Acid.—J. C. Thresh has found that the commercial red-tinted salicylic acid may be easily and inexpensively deprived of its color by dissolving it in about four times its weight of glycerin by the aid of heat, and then adding an excess of cold water. The pure acid is precipitated and the coloring matter is retained in solution. By washing with cold water, pressing between folds of filter-paper, and drying in a water-oven, it is obtained in slender white acicular prisms, having a scarcely perceptible odor, and a sweetish acid astringent taste. Ph. J. Trans., July 17th, 1875, p. 43.

J. U. Lloyd gives a working formula for the preparation of salicylic acid from oil of wintergreen, for which see A. J. Ph., August, 1875, p. 343.

Salicylic Acid is by H. Weiske proposed as an indicator in titration in place of litmus. Salicylic acid is dissolved in distilled water, filtered, and a few drops of solution of ferric chloride added. To the intensely colored solution so produced, dilute solution of soda is carefully added to accurate neutrality, which causes the intense color to be changed to a red-yellow color. A few c.c. of this test liquid are added to the acid, and this is to be titrated in the usual manner, until the color, which becomes quite intense towards the last stages of the titration, suddenly disappears. The reaction is exceedingly distinct and reliable, and much to be preferred to that of litmus. Ph. Centr. H., No. 42, 1875, p. 355.

Solubility.—F. Toussaint finds phosphate of ammonium to be a better solvent for salicylic acid than is phosphate of sodium. 30 grains of salicylic acid will dissolve in one ounce of glycerin, sp. gr. 1.261, when heated to 180° F., but the greater part is again deposited when the temperature is reduced to 30° F. 15 grains of salicylic acid and 5 grains of phosphate of ammonium in half an ounce of glycerin behaves in the same manner. 10 grains of the acid with 10 grains of phosphate of ammonium dissolves in 2 drachms of water, and when diluted with 2 drachms of glycerin afford a permanent clear liquid. 15 grains of salicylic acid, 15 grains of phosphate of ammonium, 2 drachms of water and 4 drachms of glycerin form a permanently clear solution. Am. Chem., July, 1875, p. 11.

Solubility in Solution of Borax.—Dr. H. Bose has found that 8 parts of borax has the power of rendering 10 parts of salicylic acid soluble in 100 parts of water. The borax should first be dissolved in the water and then the salicylic acid by the aid of heat. Solutions of salicylic acid for direct application to wounds should not be made stronger than 5 per cent. of salicylic acid, as solutions containing more than 5 per cent. are too irritating. Ph. J. Trans., August 7th, 1875, p. 106.

A. Vogel communicates some practical observations on salicylic acid. For the determination of the strength of its aqueous solution he prefers to titrate with soda solution, the titre of which has been previously determined by a solution of salicylic acid of known strength. This is far preferable to the method of partly saturating the solution and then evaporating to dryness, whereby inevitably a portion of salicylic acid is volatilized. As regards the production of aqueous solutions of salicylic acid, the author mentions that if an excess of the acid is dissolved in boiling water and the solution is then allowed to cool, 1 part of the acid will be retained in 300 parts of the solution; whereas if it is dissolved in cold water direct, 400 parts of water are required to dissolve 1 part of the acid. He furthermore finds that one part of the acid is readily retained in solution by 60 parts of glycerin at a temperature of 14° R. (= 63.5° F.); such a solution, however, becomes thick and turbid at 12° R. (= 59° F.). It may be diluted with water in any proportion without separating the acid. Finally, the author draws attention to the extreme sensitiveness of salicylic acid as a reagent for salts of peroxide of iron. He finds it far more sensitive than sulphocyanide of potassium, a very decided violet color being produced in solutions of chloride of iron, in which sulphocyanide produces no reaction. The reaction is not available, however, in strongly acid liquids. N. Rep. Ph., No. 3, 1876, p. 178.

M. Maury has made a compilation of different formulas for the administration of salicylic acid, which he read before the Pharmaceutical Association of Lyons, and which is published in "Répertoire de Pharmacie" (October 25th, 1875, p. 609). The paper embraces formulas for ointment (pomade), foot powder, mixtures, solution, mouth paste, lozenges, syrup, wine, and injection, all of which will be found under their proper headings in this report.

Conservative Properties.—J. C. Thresh's experiments upon the conservative properties of salicylic acid when added to infusions, etc., prove it to be very valuable, and to enable their preservation for a much longer time than under ordinary conditions. The proportion used was 5 to 10 grains to a pint of the liquid to be preserved, such as the infusions of cascarilla, quassia, orange, calumba, senna, and malt, mucilage of tragacanth and of acacia, lemon-juice, etc. It seems also to keep leeches in water healthy, by preventing the water from becoming foul. Fermentation is effectually prevented in the syrups of red and white poppies, violets, etc., when 10 grains of the acid is added to each pint, and even the addition of a little yeast to them did not induce fermentation. Ph. J. Trans., Aug. 21st, 1875, p. 141.

The application of salicylic acid to various industrial purposes, such as the conservation of food, the manufacture of glue, of leather, of perfumery, etc., is the subject of a paper by Rudolph Wagner, which contains much that is interesting and profitable. See Ph. Centralhalle, No. 37, 1875, p. 314; D. Industrie Ztg., 1875.

E. Heintz finds salicylic acid not as innocent as is generally supposed. When saturating some cotton wadding with salicylic acid, by which the hands were momentarily immersed in the solution, the skin peeled from the hands during several days following. The author has also observed that salicylic acid will prevent the action of pepsin on albumen. A mixture of 2.0 albumen, 5 drops of hydrochloric acid, 30.0 distilled water, and 0.1 of salicylic acid was made, but it acquired a putrid odor after standing 8 days. Cantharides plaster, which had been coated with an alcoholic solution of salicylic acid, nevertheless became mouldy. Arch. Ph., April, 1876, p. 324.

Sublimed Salicylic Acid.—The firm of Von Heiden decline to make sublimed salicylic acid, on the ground that the quality of the acid is thereby deteriorated. J. Biel finds this view correct. Sublimed salicylic acid, in handsome, long, glistening needles, when exposed to air and light for eight days, gave evidence of decomposition. The interior of the crystalline mass had acquired a rose-red color, and the odor of phenol was developed. Ph. Centr. Halle, No. 22, 1876, p. 186.

Salicylate of Ammonium.—Martenson recommends this salt for internal use, dissolved in aromatic water or in syrup, combinations with fruit syrup being avoided. It is readily prepared by neutralizing salicylic acid diffused in water, with ammonia or its carbonate, whereby a solution of any desirable strength may be obtained. It may be obtained in crystals (shining needles), which are readily soluble in water and in alcohol, by evaporating the solution, whereby the liquid becomes acid from the escape of ammonia; when sufficiently concentrated, it is carefully neutralized with ammonia, and allowed to cool. Its solution will keep unaltered for a long time, and has a sweetish, insipid taste. A. J. Ph., Feb. 1876, p. 66; from Phar. Zeitung, 1875, No. 102.

Salicylate of Sodium.—Hager prepares it by adding pure salicylic acid to a 10 per cent. solution of caustic soda, pure and free from carbonic acid, as long as it is dissolved, and evaporating the solution on a water-bath. It forms a soft white powder, which dissolves in its own weight or less of water, forming a faint-yellowish syrupy fluid, and has a sweetish taste, which subsequently becomes acrid. It is very sparingly soluble in absolute alcohol, but dissolves in at least 8 parts of 90 per cent. alcohol. When incinerated, it leaves 33 per cent. of residue in the form of carbonate of sodium. Its purity is determined, 1, by its perfect solubility in water, alcohol, and ammonia-water; 2, by its solution in ammonia-water not changing when boiled with nitrate of silver; 3, by the indifferent behavior of its aqueous solution to carbonate of sodium; 4, by the re-solution of the precipitate produced by nitrate of silver in its aqueous solutions upon the addition of alcohol and nitric acid; 5, by its aqueous solutions not being affected by chloride of barium. Ph. Centralhalle, No. 12, 1.

Nitrosalicylic Acids.—By nitrating salicylic acid, L. B. Hall obtained three distinct isomeric nitro-derivatives.

I. The already known nitrosalicylic acid, which melts at 228° C. (= 342.4° F.), and is the least soluble of the three derivatives.

II. From the mother-liquor of this acid he obtained a barium salt which was a compound of an acid, having its melting-point at 124° C. (= 264.2° F.), crystallized in long colorless needles, was sparingly soluble in cold water, but readily dissolved by boiling water and by alcohol.

III. The mother-liquor from the barium salt yielded a third acid. This forms long colorless needles, which are sparingly soluble in cold water, and melt at 218° C. (= 424.4° F.). The composition of the three acids is the same; it corresponds to the formula $C_6H_3OHNO_2,COOH$ (O = 16). Arch. Ph., Aug. 1876, p. 166.

Succinic Acid.—E. Burgoin has determined the solubility of succinic acid in water at various temperatures, and finds it to be as follows:

100 parts by weight of water contain:

At	0.0° C. (= 32.0° F.),	2.88	parts of succinic acid.
“	8.5° C. (= 47 3° F.),	4.22	“ “ “
“	14.5° C. (= 58.1° F.),	5.14	“ “ “
“	17.0° C. (= 62.6° F.),	5.74	“ “ “
“	27.0° C. (= 80.6° F.),	8.44	“ “ “
“	35.5° C. (= 95.9° F.),	12.29	“ “ “
“	40.5° C. (= 104 9° F.),	15.37	“ “ “
“	48.0° C. (= 118.4° F.),	20.28	“ “ “

The solutions were prepared by dissolving the succinic acid with the aid of heat in distilled water, cooling them very gradually to the temperature at which they were titrated, and previous to the latter operation agitating them vigorously with an excess of acid. At a temperature above 50° C. (= 122° F.) the determination of its solubility by the acidimetrical method becomes more difficult, and the author therefore did not pursue that method further. By the ordinary method, evaporation and weighing the residue, he obtained the following additional results:

At	78° C (= 172.4° F.),	60.775	parts of succinic acid.
“	the boiling-point,	120.186	“ “ “

It seems, therefore, that the solubility of succinic acid in water is rapidly increased by an increase of the temperature above 50° C. (= 122° F.), and that at the boiling-point it requires less than its weight of water, and not, as Lecann states, two parts. Zeitschr. Œst. Ap. Ver., No. 23, 1875, p. 372.

Reactions.—According to S. Lupton, if nitrate of uranium is added to a neutral succinate, a very sparingly soluble pale-yellow precipitate is formed, which is soluble in acetic acid, but insoluble in solution of oil of amber, in alcohol, in excess of succinate of ammonium, or in acetate of sodium. *Benzoate of uranium* is almost identical in appearance and properties. When nitrate of cobalt is added to a solution of a *neutral* succinate, the liquid changes to a peculiar purple or "peach-blossom color," and if the solution be concentrated a precipitate falls. On the addition of ammonia the solution so precipitated becomes more and more blue. This precipitate is soluble in acetate of sodium. The presence of oil of amber seems greatly to facilitate the precipitation; as also does alcohol, but in this case the precipitate is pink. *Benzoate of cobalt* is red when formed in the cold, green when produced at the boiling-point; it is very soluble. Ch. N., March 3d, 1876, p. 90.

Citric Acid.—Robert Warington has communicated to the Chemical Society of Great Britain a very lengthy and valuable paper on the chemistry of tartaric and citric acid, in which he specially treats of the methods of analysis of the various materials with which the manufacture of these acids is concerned. The paper is important as coming from one who has abundant experience in the manufacture of these acids; and the publication of facts connected therewith is very creditable to the author. The author's paper, which covers seventy pages of the journal of the Chemical Society (October, 1875, pp. 925 to 994), is too extensive for more than a brief extraction of the leading points, which will be found in the following, and under the head of tartaric acid.

Standard Alkali and Acid.—The standard alkali used is a solution of caustic soda containing 0.5 gram of pure caustic soda in 100 c.c. The solution made from metallic sodium is best, since the purer the soda the more sharp is the reaction. The standard acids are dilute hydrochloric and dilute sulphuric acids, made so that 20 c.c. are equal to 100 c.c. of alkali. The sulphuric acid is preferred for all purposes, except when much carbonate of calcium has to be acted on, when hydrochloric acid is used.

Litmus-Paper.—A strong solution of litmus in cold water is prepared, clarified by subsidence and filtration, boiled with a slight excess of nitric acid to destroy carbonates, filtered through Swedish filtering-paper, and caustic soda is added to produce the desired tint, three tints of violet being prepared. With the properly-prepared solution sheets of thin demy paper are painted on one side, which is then flooded with the liquor and kept in motion between the hands for a few minutes, so as to pass the flood to and fro over the surface. This prevents the color from washing out when the paper is used. Extreme delicacy is attained when the paper is not too deeply colored, and when the tint approaches neutrality; pale or neutral paper is worthless.

Commercial crystallized citric acid is, in the citric acid trade, usually reckoned to contain one-half molecule of water. Numerous determinations made prove it to contain one molecule of water of crystallization, corresponding to the formula, $C_6H_8O_7,H_2O$ ($O = 16$); a quantity which corresponds to the statements in manuals on chemistry for the acid crystallized from cold solutions. The determination is best made by heating the powdered acid for some hours at 50° to 60° C. (= 112° to 120° F.), and then gradually raise the temperature to 100° C. (= 212° F.); otherwise the acid partially melts and requires heating for many days. Its strong aqueous solutions suffer contraction when mixed with water; 500 volumes of a solution of sp. gr. 1.2709 (bright liquor of the factory) requires 503.61 vol. of water to make 1000 volumes after mixing; no rise in temperature was observed. Nearly the whole of the citric acid manufactured in England is made from *concentrated lemon-juice*, exported from Sicily and South Italy. This juice, as exported, is the product of the windfalls and the damaged fruit, and varies in its acid strength according to the season, the lemons being more acid in the beginning of the season. The *raw juice*, for which 13,000 lemons are required to make one pipe = 108 gallons, will vary between 9 oz. to the gallon in November to 6 oz. in the following April, and is weaker than juice expressed in England, which contains from 11 to 13 oz. The *concentrated juice* is a syrupy liquor of a dark-brown color, obtained by boiling down the raw juice in copper vessels over an open fire until it is supposed to mark when cold 60° (= 1.2394 sp. gr.) on the citrometer; in which condition it occupies about $\frac{1}{9}$th or $\frac{1}{10}$th the bulk of the raw juice, and contains from 60 to 70 oz.—on an average 64 oz. normal = 66.87 oz. crystallized citric acid per gallon. Besides this it contains from 6 to 8 oz. of combined acid. *Bergamot-juice* is also exported from South Italy for the manufacture of citric acid, and contains from 49.4 to 55.5 oz. of acid in the gallon. *Lime-juice*, which is chiefly used as a beverage, however, contains about 12 oz. acid in the gallon. *Concentrated lime-juice* is a thick viscid fluid, exceeding both in density and acidity the concentrated lemon-juice. The quantity of combined acids in the bergamot and lime-juice is about the same as in the lemon-juice, but is more constant in the lime than either in the lemon or bergamot. Lemon-juice is now generally purchased on the basis of its acidity. The acidity of the concentrated juice is conveniently determined by diluting 50 c.c. of the juice to 500 c.c. and then taking for experiment 30 c.c. of the solution. Standard alkali is added in quantity of about $\frac{5}{6}$ths of that which will be required; the whole is then boiled for a few minutes, and when quite cold the titration is completed. While free citric acid cannot be exactly determined by neutralization with standard alkali, the use of very delicate litmus-paper very nearly enables the determination of the theoretical quantity. To obtain accurate results the citric acid is best converted into lime salt. 15 to 20 c.c. of the raw or 3 c.c. of the concentrated juice are exactly neutralized with caustic soda; the solution is brought to 50 c.c., boiled in a salt-bath, and a slight excess of chloride of calcium is added. The precipitate is well washed with hot water, the washings—which contain some citrate of calcium—are concentrated to 10 to 15 c.c. and allowed to deposit; the precipitate is collected, well washed with hot water, and the filtrate and washings are then evaporated a third time to obtain the remainder of citrate of calcium. Finally the well-washed precipitate of citrate of calcium is, with the filters, incinerated, and the alkalinity of the ash is determined by titration with acid; the figures obtained giving the quantity of citric acid by calculation.

Citrate of Calcium.—The author found that citrate of calcium dried at 100° C. (= 212° F.) retains more than one molecule of water —the quantity given in Gmelin's Chemistry ($C_{12}H_{10}Ca_3O_{14},H_2O$) —the percentage being nearly two molecules. The crystalline salt was found to be soluble in 1133 parts of water at 14° C. (= 57.2° F.), and in 1754 parts at a boiling temperature, the sample being prepared by neutralizing citric acid with lime-water and boiling. Another specimen of citrate, prepared by adding pure carbonate of calcium to a hot solution of citric acid, gave at 14° C. (= 57.2° F.) a solubility of 1 in 1223, and at 90° (= 194° F.) a solubility of 1 in 1874. A third specimen, prepared by slowly adding citric acid to carbonate of calcium diffused in hot water, gave at 14° C. (= 57.2° F.) a solubility of 1 in 1183, and at 90° C. (= 194° F.) a solubility of 1 in 1652. Finally, a fourth specimen, prepared in the factory in the ordinary process of adding lemon juice to chalk, proved to be remarkably soluble, since it required but 707 parts at 18° C. (= 64.4° F.), and 1123 at a boiling heat, thus justifying Liebig's remark, that amorphous citrate is more soluble than crystalline citrate. The statement in "Gmelin's Chemistry" and other manuals, that the solubility of citrate of calcium in ammonium salts is so great, that if the citrate be dissolved in hydrochloric acid and ammonia added, no precipitate takes place unless the solution be boiled, is erroneous according to the author's experience. The fact is, that if sufficient time is allowed, precipitation does take place in the cold, although the rapidity with which the precipitation commences, and the time required for its completion, is very materially affected by the quantity of ammonium salts present. Commercial citrate of calcium, introduced occasionally into the market as a material for the manufacture of citric acid, contains chalk or lime in excess, and besides this may contain carbonate, due to the decomposition of the citrate, a result which readily takes place if more than 12 per cent. of water is present. The analytical method for determining its value consists in determining the excess of chalk or lime, then igniting another portion, boiling the ash with standard hydrochloric acid in a covered beaker, filtering, and ascertaining by titration the amount of acid employed. The figures obtained give the basis for calculating the value of the sample, presuming that citric acid is the only organic acid present. The author, furthermore, draws attention to the difficulty of neutralizing lemon-juice with chalk, a difficulty which, in "Richardson and Watts's Chemical Technology," is stated to be owing to alumina in the juice. This he finds to be incorrect, and states that it is really due to the presence of phosphoric acid and iron. Finally, some practical points in regard to the analysis of the citric acid liquors of the citric acid factory, etc., are given.

Citrate of Lithium.—C. Umney has made some experiments upon citrate of lithium, from which he concludes that neither the proportion of citric acid and carbonate of lithium employed in the formula of the Br. Ph. (180 parts of acid to 100 parts of carbonate), nor those recommended by Squire in his "Companion to the Pharmacopœia" (p. 180), and adopted by the U. S. Pharmacopœia (200 parts of acid to 100 parts of carbonate) are correct, either by actual calculation or in actual practice. 100 parts of carbonate of lithium will be required to neutralize 189.2 parts of citric acid, the product of anhydrous citrate of lithium being identical with the amount of citric acid originally employed. Commercial carbonate of lithium of fine quality, containing 98.5 per cent. of real carbonate, the proportion would be 100 parts of carbonate and 186.5 parts of acid. The impression seems to prevail that citrate of lithium is deliquescent. This is not true either of the anhydrous or crystalline salt; and such being the case, the author sees no reason why the definite crystallized citrate, which contains one molecule of water, should not be preferred to the anhydrous citrate of the Pharmacopœias. A solution of sp. gr. 1.230, when set aside, produced crystalline citrate of lithium, more generally used in pharmacy fifteen or twenty years ago than at the present time. Ph. J. Trans., September 11th, 1875, p. 214; from Proc. Br. Ph. Conf.

Citrate of Iron and Quinia.—When the directions of the Pharmacopœia for the preparation of this compound are followed, the quinia is liable to form a gummy, sticky mass, and will fail to dissolve readily in the solution of citrate of iron. J. U. Lloyd finds that this may be obviated by attention to the temperature at which the precipitation of the quinia and its subsequent solution are effected, which, in neither instance, should exceed 50° F. By precipitating at 50° F. the quinia forms a light, friable, porous mass, which is readily washed, and readily dissolves in the solution of citrate of iron at that temperature. A. J. Ph., March, 1876, p. 107.

Citrate of Bismuth.—R. Rother finds that when the ordinary subnitrate of bismuth is heated for a few moments with its equivalent of citric acid in concentrated aqueous solution, the bismuth compound is completely converted into the normal citrate, and may be freed from nitric acid by washing by decantation. The proportions are 10 parts of subnitrate of bismuth, 7 parts of crystallized citric acid, and 30 to 40 parts of water, which are heated together until a portion of the mixture forms a clear solution with ammonia-water. The yield is $13\frac{2}{3}$ parts, proving the compound to be anhydrous. The product is readily convertible into the soluble

Ammonio-citrate of Bismuth by dissolving it in ammonia, which forms a syrupy solution, and partly a hard white mass; on applying gentle heat a clear solution is obtained, which, on cooling, forms a crystalline mass of ammonio-citrate perfectly soluble in water. The yield from 8 parts of citrate is nearly 10 parts of ammonio-citrate. The author finds that the chemical composition of ammonio-citrate of bismuth has not been correctly given; the same quantity of ammonia being required for the citrate of bismuth as the citric acid alone requires. The formula should, therefore, be written thus: $(NH_4)_3,C_6H_5O_7,Bi(OH)_3$. This compound, when brought in contact with an equivalent of the green ammonio-citrate of iron (which requires the same quantity of ammonia as does the corresponding bismuth compound), forms a light-green solution, from which moderate or strong acidulation with citric or nitric acid fails to separate the citrate of bismuth. Hence, by taking advantage of this fact, it becomes possible to hold ammonio-citrate of bismuth in solution, providing that ammonio-citrate of iron is present at the same time. A. J. Ph., March, 1876, p. 105.

Tartaric Acid.—The following is a brief extract of that portion of R. Warington's very valuable paper "On the Chemistry of Tartaric and Citric Acid," which relates to tartaric acid. For the proper understanding of some of these extracts the reader is referred to the article, "Citric Acid," preceding this.

Strong solutions of tartaric acid contract on mixing with water even more than citric acid liquors, 500 volumes of a solution of tartaric acid of sp. gr. 1.338 (bright liquor of the factory) requiring 505.508 volumes of water to produce 1000 volumes, and, as in the instance of citric acid, no rise in temperature was observed. Free tartaric acid can be determined without difficulty by titration with caustic alkali, the final reaction with litmus being much sharper than is the case with citric acid, though distinctly less sharp than with hydrochloric or sulphuric acid. Some qualitative experiments were made with a view to distinguish between tartaric acid and the acids which it yields on application of heat. When dry tartaric acid is carefully melted, some *ditartaric* acid is invariably produced along with metatartaric acid. The formation of the former is readily shown by the alteration in the neutralizing power. If the fused acid is neutralized with soda, and is then boiled, the ditartaric acid is reconverted partly into tartaric and into metatartaric acid; the liquid acquires powerful acid properties, and if it is neutralized from time to time, and the boiling continued, the total alkali so consumed will be found equal to that required previous to fusion. For this reason also it is difficult to neutralize ditartaric acid with chalk at a boiling temperature, the continual splitting up of the ditartrate of calcium producing a fresh acidity. Acetate of calcium produces in solutions of fused tartaric acid a plastic precipitate, which is easily soluble in cold water, and which the author believes to be ditartrate of calcium. Acetate of potassium produces in solutions of fused tartaric acid a precipitate of metatartrate of potassium, which in dilute solution forms much slower than that of the ordinary tartrate, being more soluble than the latter. The precipitate is also more bulky and less crystalline. Contrary to the statement of most manuals, ordinary tartaric acid may be precipitated by some salts of calcium. Thus the acetate yields, even in dilute solutions, a precipitate of tartrate of calcium, and, in the presence of alcohol, chloride of calcium also produces a precipitate.

Tartrate of Calcium.—It is stated in "Gmelin's Chemistry" that the neutral tartrate of calcium ($C_4H_4CaO_6,4H_2O$ ($O = 16$)) has the same composition when dried at 100° C. (= 212° F.). The author's experiments prove that a portion of water is lost at that temperature, but that it has no definite composition at 100° C. (= 212° F.).

Bitartrate of Potassium.—Experiments with bitartrate of potassium (containing 99.33 per cent. real bitartrate) prove it to possess the following solubilities in 100 parts water:

At 14° C. (= 57.2° F.)	0.431	bitartrate,	or 1 in 232.
At 22° C. (= 71.6° F.)	0.600	"	or 1 in 167.
At 80° C. (= 176° F.)	4.027	"	or 1 in 25.

The solubility is very greatly affected by the presence of certain salts and certain acids. Crystals of chloride, sulphate and nitrate of potassium, and of Rochelle salt added to a cold saturated solution, speedily produce a precipitate of bitartrate. Acetate and citrate of potassium, citric, sulphuric, hydrochloric, and nitric acid increase its solubility, while it is less soluble in solution of tartaric acid than in water.

Lees, Argol, and Tartar.—The materials from which tartaric acid is made may be classed as lees, argols, and tartar. *Lees* is the solid matter collected from the bottoms of fermenting vessels, and is obtainable from all wine-producing countries having easy communication with the sea. Its composition varies very much according to the particular method of making the wine, the addition of plaster of Paris or of Spanish earth introducing excessive quantities of lime, magnesia, silica, iron, alumina, sulphuric acid, etc. The process of "plastering" is resorted to principally in Spain, and probably also in Southern France, and has for its effect the clarification and partial neutralization of the wine. The latter effect is due to the presence of carbonates of calcium and magnesium in the "*yeso*," as the plaster is called. The presence of sand, soluble silica, and alumina may arise from soil adhering to the grapes, but more probably from the Spanish earth employed for clarification. The following table gives the result of analysis of the lees from various countries:

	Tartaric Acid as		Total Tartaric Acid.
	Bitartrate of Potassium.	Tartrate of Calcium.	
Italian lees, 33 samples, . . .	24.1	6.1	30.2
Greek " 14 " . . .	19.9	11.8	31.7
French " 9 " . . .	17 3	6.0	23.3
" " 30 " . . .	5.3	20.5	25.8
Yellow Spanish lees, 59 samples,	8.7	18 2	26.9
Red Spanish " 17 "	8.8	17.4	26.2

Argol is the thin crystalline crusts deposited on the sides of the fermenting vessels. It exhibits a wide range of composition, containing from 40 to 70 per cent. of tartaric acid, present chiefly as bitartrate of potassium. Occasionally small lumps, from the sulphuring of the casks, are associated with it.

Tartar is manufactured from both the lees and argol by a rough method of extraction with hot water and crystallization, and is procured chiefly from Italy; France exporting a smaller quantity, and other European countries none. This is dependent not so much on its home consumption, but very greatly on the fact whether the wine is plastered or not. If the wine is plastered, the lees contain tartrate of calcium instead of bitartrate of potassium, and consequently there is little material from which tartar can be made. The highest quality tartrates are those of South Italy and Messina, which contain about 76 per cent., and in some instances 77 per cent of tartaric acid (pure bitartrate of potassium contains 79.6 per cent.). Ordinary Italian tartars contain 74–75 per cent., of which 3–4½ per cent. as tartrate of calcium. Vinaccia tartar, which is made in various parts of Italy and France, from the solid matter of grapes after the must is expressed, contains 70–73 per cent. of tartaric acid. The author communicates analyses of "yeso," Spanish earth, French and Spanish lees, and of Messina and St. Antimo tartar, and gives the methods usually followed for the determination of tartaric acid in tartar, argol, and lees, and the modifications necessary to insure accurate results in the presence of various impurities and differences of composition. Methods for the analysis of the tartaric acid liquors of the factory and of determining the nature of the organic acids present in such liquors are also given. Finally, a chapter is devoted to the behavior of tartaric and citric acid towards iron, aluminum, and phosphoric acid. The first two are completely precipitated, and the liquor is readily neutralized with chalk in tartaric acid solution, but citric acid solutions containing them are not readily neutralized. The same is true of both tartaric and citric acid solutions containing phosphoric acid; and iron and alumina present under these conditions are not completely precipitated. In old tartaric acid liquors these conditions frequently prevail, and hence the difficulty often experienced to neutralize them with chalk. J. Chem. Soc., October, 1875, pp. 925–994.

Tartarus Boraxatus, when prepared from cream of tartar containing tartrate of calcium, may, according to Hirschberg, be deprived of the latter by subjecting the clear solution to freezing, draining the crystalline mass formed from the syrupy mother-liquor, and then allowing the crystals to melt on a linen strainer at as low a temperature as possible. The tartrate of calcium will remain upon the strainer in the form of a crystalline powder. Ph. Centralhalle, No. 29, 1875, p. 241.

Normal Pyro-tartaric Acid.—Reboul finds that this acid crystallizes in triangular laminæ belonging to the clinorhombic and hemihedral type. Its analysis gives $C = 45.2$, $H = 6.0$, theory requiring $C = 45.4$, $H = 6.0$. It distils without alteration at 299° C. (= 570.2° F.). Its point of solidification and fusion is 96° C. (= 204.8° F.). It is very soluble in cold water, and in boiling water dissolves in all proportions. It is soluble in absolute ether and alcohol. The author has examined the neutral salts of barium and of calcium. Ch. N., June 16th, 1876; from Compt. Rend., May 21st, 1876.

Meconic Acid.—A. Dupré has found that, similar to their action upon the well-known blood-red color produced by ferric salts upon sulphocyanides (which see, in this report), the phosphoric acids and phosphates are capable of destroying the blood-red color produced by ferric salts upon meconic acid, and that, as in the instance of sulphocyanides, ordinary phosphoric acid or phosphates react the least, while metaphosphoric acid or its salts react the most powerfully. Phosphoric acid being almost always contained in the organic liquids likely to be tested for the presence of meconic acid, and being moreover separated along with this acid by the methods usually pursued, the phosphoric acid should be carefully removed before applying the test. The author has found that oxalic acid will also prevent the color reaction. Ch. N., July 9th, 1875, p. 15.

Pure Oxalic Acid.—To obtain a chemically pure oxalic acid Louis Siebold recommends that the commercial acid be agitated with five times its weight of distilled water at about 100° F. for some time, allowing the mixture to stand in a cool place for about six hours, filtering the solution, evaporating it to about two-thirds of its original bulk, and stirring the solution well while cooling. The crystals are collected in a filter, washed, and twice recrystallized from boiling distilled water. The acid so obtained leaves no residue whatever when ignited in a platinum crucible. The large proportion left undissolved by the tepid water, as well as that contained in the mother-liquors, may be recrystallized and used as commercial acid. Stolba's method (see Proceedings, 1875, p. 385) does not yield as satisfactory a product. Ph. J. Trans., December 4th, 1875, p. 441.

Levulinic Acid.—When cane sugar (rock candy) is heated for a week with diluted sulphuric acid, among other products there is formed, according to A. von Grote and B. Tollens, *levulinic acid* —$C_5H_8O_2$ ($O = 16$). 400 parts of rock candy, 400 parts conc. sulphuric acid, and 4300 parts of water are heated in a flask, provided with a long straight tube, in a nitre-bath at a boiling temperature for a week. The mixture, which becomes brown and deposits a dark matter, is filtered and saturated with chalk and litharge, heated, and treated with sulphydric acid. It is then (filtered?) evaporated to a syrupy consistence, mixed with 3 to 4 volumes of alcohol, decanted from precipitate, the alcohol distilled off, and allowed to stand several days, when a crystalline mass of levulate of calcium is obtained, from which the brown syrupy liquid is removed by washing with alcohol and recrystallization. From the levulate of calcium the various salts of levulinic acid may be obtained by double decomposition; the acid itself by decomposition with oxalic acid. The acid is miscible with water and is solid at a low temperature. It cannot be obtained from glucose, but is readily obtained from inulin, which, as is well known, is converted by the action of acids into levulose. It therefore follows, that of the two sugars, glucose and levulose, into which cane-sugar is converted by the action of acid, the levulose yields the acid under consideration. Arch. Pharm., July, 1875, p. 64.

Levulinic acid has also been prepared from such substances as filtering-paper, pine wood, and carrageen moss, by Fr. Bente. The author first dissolved the substances as far as possible in a cold mixture of 4 parts of sulphuric acid and 1 part of water (parchment paper acid), diluted the solution to such an extent that a 5 per cent. acid resulted, boiled the mixture upon a saltpetre bath for eight days, saturated the acid with powdered marble, filtered the solution, evaporated the solution, acidulated the syrupy liquid with dilute sulphuric acid, and then agitated it with ether, which dissolved the levulinic acid along with some formic acid which had formed. The latter was evaporated, the levulinic acid converted into a zinc salt, and this by double decomposition into a silver salt, which proved to have identical composition and form, etc., with the silver salt prepared with levulinic acid from sugar. Ch. C. Bl., No. 23, 1875, p. 356.

Equinic Acid.—A new acid pre-existing in the recent milk of mares.—J. Duval has determined the presence of a proximate principle in mare's milk, which is not found in the milk of ruminants, and which he names equinic acid. This crystallizes in groups of small needles, is not volatile without decomposition, and has a fragrant odor and peculiar taste. It is distinguished from hippuric acid by its reactions with nitrate of silver, perchloride of iron, chloride of gold, etc. Ch. N., March 10th, 1876, p. 108; from Compt. Rend., February 14th, 1876.

Picric Acid.—Dr. G. C. Wittstein calls attention to acaroid resin (from Xanthorrhœa arborea), familiarly known as Botany Bay gum, as an abundant and cheap source of picric acid. 150 grains of the pulverized resin were placed in a beaker, and 750 grains of crude nitric acid, of sp. gr. 1.16, poured over it; the beaker was covered with a glass capsule, and digested at a gentle heat. The mass soon swelled up, and a deep brown-crust formed over the liquid. This crust needed to be broken up from time to time with a glass rod. Nitrous fumes ceased to be evolved in about three hours, when it was allowed to cool, and on standing until next day, an abundant layer of picric acid had settled to the bottom. On separating these, and treating the residual matter with an additional quantity of nitric acid, no fumes were given off, showing that the reaction was complete. The yield was 100 grains of crude acid, which when purified by recrystallization, to remove a little oxalic acid formed, weighed 75 per cent. grains = 50 per cent. of the crude material employed. The Pharmacist, Nov. 1875, p. 341.

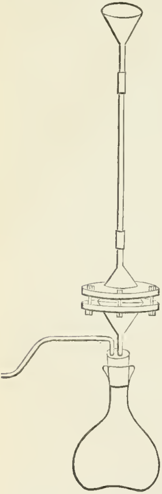
Sarkosinic Acid.—J. Hertz obtained from the aqueous solution of a resinous substance, known in Mexico as *Goma de Sonora*, and found to be in fact a variety of crude shellac, a crystalline acid, which, owing to its close solution with sarkosin, he has named sarkosinic acid. It crystallizes in small scales, which are yellowish, and possess silky lustre. The acid is readily soluble in cold water, very readily in hot water, sparingly in dilute alcohol, and absolutely insoluble in absolute alcohol and in ether. Boiling ordinary alcohol dissolves the crystals, and on cooling deposits them, but in a perfectly colorless pulverulent condition, and this method may therefore be pursued to obtain the acid perfectly pure, simple recrystallization from watery solution reconverting the pulverulent acid into the crystals of the original form. Its composition corresponds to the formula $C_3H_7NO_2$ ($O = 16$). It forms salts with the metallic oxides, of which those of silver and of sodium are crystallizable, while the salts of barium and calcium were obtained in an amorphous condition; all of them are neutral, and readily soluble in water. Arch. Ph., March, 1876, pp. 234–250.

Oak-Tannins.—J. Oser proves the presence of an abundance of querco-tannic acid in green oak leaves, and considers them on this account suitable for tanning purposes; they also contain elagic acid, but no gallo-tannic acid. The galls found upon the green leaves contain but a small quantity of querco-tannic acid, but considerable quantities of gallo-tannic and elagic acids. The author's results in regard to the tannic acid of the oak-bark (querco-tannic acid) correspond with those obtained by A. Grabowski, according to which querco-tannic acid is a glucoside which contains but traces of gallo-tannic acid. The author, furthermore, finds two sources of error in Loewenthal's method of determining the tannic acid in oak bark. The quantities of oxygen required by equal quantities of querco-tannic and gallo-tannic acids are not equal, but are as 1 to 1.5; consequently the method gives too small a percentage of querco-tannic acid. The other error is due to the circumstance that the aqueous extracts of oak bark contain, beside querco-tannic acid, a number of other substances in considerable quantities, which are likewise oxidized by permanganate of potassium, and hence in this direction the percentage of querco-tannic acid becomes too large. Ch. C. Bl., No. 33, 1875, p. 517.

Tannic Acid of Hops.—C. Etti has obtained the tannic acid of hops in the form of a fawn-colored powder. It is readily soluble in water, diluted alcohol, and acetic ether; not so soluble in absolute alcohol, and insoluble in ether. Its aqueous solution precipitates albumen, renders solution of gelatin opalescent, without producing precipitation; does not precipitate tartar-emetic solution;

but precipitates sulphate of copper solution dirty green. It is precipitated from its solutions by mineral acids and by chloride of sodium. It decolorizes iodide of starch, reduces alkaline copper solutions abundantly, and is colored dark green by sesquichloride of iron; alkalies produce a dark, red-brown color; caustic baryta and lime produce brown-yellow precipitates, and acetate of lead a pure yellow precipitate, which, however, is not completely separated until the liquid is accurately saturated with ammonia. The experiments prove this variety of tannic acid to be closely related, if not identical, with the tannic acid of oak bark, rhatany, male fern, etc. Ch. Central Bl., No. 17, 1876, p. 261; from Ann. Chem.

FIG. 42.



Tannin.—Estimation.—The method for the estimation of tannin devised by Müntz and Ramspacher (see Proceedings, 1875, p. 388), which is based upon the fact that when a solution containing tannic acid is forced through well-washed untanned hide, the hide fixes the tannin, requires an apparatus which, as described by the authors, is quite expensive and troublesome to construct. William Thompson has contrived an apparatus to which these objections do not apply. Two strong ground-glass funnels with rather wide stems are taken, a circular piece of hard wood fitted on each (as shown by Fig. 42), the bottom part of which comes within the eighth of an inch from the top of the funnel; four holes are made through the wood, into which are inserted ordinary long iron screws fitted with nuts; the hide is placed between the funnels, and the nuts screwed on and tightened equally all round; a funnel with a thin stem is then inserted into the larger stem of the top funnel, and the liquor poured in; the stem of the under funnel is passed through an india-rubber cork fitted into a flask; the flask is attached by another tube penetrating the cork to a Bunsen's vacuum pump; the vacuum is made and the liquor allowed to filter slowly through. Quicker filtration may be produced by applying pressure above and suction below, by completely filling the upper funnel with liquid, attaching to its stem by strong caoutchouc tubing a long tube ending in another funnel (as shown in the engraving), and filling the tube and upper funnel with liquid. Ch. News, December 31st, 1875, p. 310.

H. R. Procter's experiments with the process of Müntz and Ramspacher, although not yet completed, seem to indicate that the process is liable to inaccuracy, since a 2 per cent. solution of tannin is the strongest which is suitable for the process. Another source of inaccuracy is that it is very difficult to insure complete absorption of the tannin. Even with a 1 per cent. solution a considerable quantity of tannin passed through a piece of hide 2 to 3 millimetres thick, as was shown by its forming a precipitate with gelatin and with ammonio-acetate of copper. Ch. N., June 16th, 1876, p. 245.

In decoctions of sumach, divi-divi, and similar substances, tannic acid may, according to S. J. Simpkin, be separated by precipitation with a solution of ammoniacal sulphate of copper, care being taken that ammonia is employed in excess. 5 grams of the material is extracted with water and made up to one litre; 10 cubic centimetres of this solution are acidified with sulphuric acid, diluted with water, and titrated with permanganate of potassium. 100 cubic centimetres of the tannin extract are now precipitated with ammoniacal sulphate of copper, taking care that there is an excess of ammonia, and the precipitate is filtered off. The first few drops of filtrate being rejected, 10 cubic centimetres* of the remainder are now titrated with permanganate of potassium in the same manner as the original solution. The difference between the two titrations (in the quantity of permanganate employed) will indicate the quantity of tannic acid. Ch. News, July 9th, 1875, p. 11.

Antonio Carpene determines tannic acid in wines by precipitating with ammoniacal acetate of zinc containing a large excess of ammonia. Ch. News, July 9th, 1875, p. 19; from Gaz. Chim. Italiana, 1875, No. 3.

Pyrogallol.—J. Stenhouse and Ch. E. Groves have studied the action of chlorine upon pyrogallol, and find that when chlorine is passed through a solution of pyrogallol in glacial acetic acid, which

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* Allowance must be made for the increase in volume occasioned by the addition of the ammoniacal copper solution.—Rep.

is at first kept cool, but towards the end of the process heated to about 70° C. (= 158° F.), a new crystalline compound, of composition $C_{18}H_7Cl_{11}O_{10}$ (O = 16), is formed, which they have named

Mairogallol (from μαίρω, to glitter, to sparkle). This is a colorless substance, crystallizing in orthorhombic prisms; it is insoluble in water, but is decomposed when boiled with it for a long time; it is readily soluble in ether, and also readily in hot alcohol, but decomposed by the latter. Benzene dissolves it sparingly; in bisulphide of carbon or light petroleum it is insoluble. If the solution of pyrogallol in glacial acetic acid is saturated with chlorine in the cold, and some concentrated hydrochloric acid is added, followed by a rapid current of chlorine, in the course of a few minutes the liquid solidifies to an orange-colored mass, composed of impure

Leucogallol, which is purified by suitable means suggested by the authors. When pure, leucogallol forms colorless crystalline crusts, which are easily soluble in water or alcohol, less soluble in ether, slightly soluble in benzene, and insoluble in bisulphide of carbon or light petroleum. Its aqueous and alcoholic solutions readily decompose. Its composition corresponds to the formula $C_{18}H_{10}Cl_{12}O_{14}$. J. Chem. Soc., August, 1875, pp. 704–712.

ORGANIC BASES.

Natural Alkaloids.—Action of Organic Acids and their Anhydrids at Elevated Temperatures.—G. H. Beckett and C. R. Alder Wright are engaged in determining the nature of the reaction and the products formed when natural alkaloids are acted upon by organic acids at a temperature of about 180° C. (= 356° F.). In Jour. Chem. Soc., August, 1875, pp. 689–699, the author communicates the results obtained by the action of succinic, camphoric, tartaric, and oxalic acids, upon morphia and codeia. The paper is not suitable for extraction for this report.

Action of Acids upon the Rotating Power of Alkaloids.—The technical importance of the rotating power of sugar solutions, by which an accurate and ready means for its quantitative determination is afforded, has induced A. C. Oudemans, Jr., to experiment with a view to utilizing the rotating power of the cinchona alkaloids. The very comprehensive experiments of the author included the determination of the rotating power of the pure substances in neutral solutions, and the extent to which their rotating power was influenced or modified by their combination with acids, by an excess of acid, or by a mixture of various alkaloids. While the results do not seem to lead to a satisfactory application of the principle, some facts of scientific interest have been developed in regard to the influence of acids upon the rotating power of the alkaloids. It was found that both with the inorganic and organic acids the maximum of rotating power is not reached when the alkaloid is combined with sufficient acid to form a so-called acid salt, but that with the strong mineral acids the quantity must be in slight excess; but if more acid is then added the rotating power is diminished very rapidly. Phosphoric acid, however, makes an exception; it acts like formic and oxalic acids, and the maximum of rotating power is not reached until a comparatively large excess of acid has been added. Acetic acid does not produce this maximum until an exceedingly large excess—60 mol. acid to 1 mol. alkaloid—has been added. Zeitschr. Œst. Ap. Ver., No. 34, 1875, p. 552.

Alkaloids.—Solutions in Oils.—J. B. Barnes suggests the solution of alkaloids in fixed or volatile oils by the intervention of glacial acetic acid, which with many oils form clear and permanent mixtures. Solutions of aconitia, atropia, morphia, and veratria, in glacial acetic acid, unite with almond oil and oil of turpentine, forming clear solutions, which after exposure in open test-tubes for several days remained clear and without change; quinia and cinchonia also unite with almond oil when dissolved in glacial acetic acid. These solutions may be made of any desired strength, and do not lose their transparency when mixed with chloroform and camphor. The disagreeable odor of oleic acid is an objection to its employment for the solution of alkaloids, which the author suggests may be overcome by the use of oils instead. (See Glacial Acetic Acid.) Ph. J. Trans., September 11th, 1875, p. 201.

Sulpho-Compounds of the Alkaloids.—The experiments inaugurated by A. W. Hofmann, and subsequently continued by Wichelhaus, upon the action of sulphydric acid on strychnia and brucia, have been taken up by E. Schmidt, who finds that with few exceptions, all alkaloids from plants seem capable of yielding sulpho-compounds by the action of sulphydric acid. The exceptions seem to be the weak bases, such as those of the uric acid group, caffeia, theobromia, etc., which are indifferent to the action of HS. The author has examined thoroughly only the sulpho-compounds of strychnia and brucia, whose preparation and properties he describes in Ber. Chem. Ges., 8, p. 1267. Ch. C. Bl., No. 48, 1875, p. 9.

Alkaloids and Glucosides.—Modified Reactions.—The color reactions produced with alkaloids and other poisonous proximate principles, by the action of concentrated acids, are by reason of the complex constitution of these principles quite unstable. O. Pappe finds that by the intervention of starch (Amylum tritici), the very rapid decomposition may be present to some extent, and, consequently, color reactions of greater stability obtained with many of the alkaloids. This is the case with brucia, codeia, narcotina, narceina, veratria, digitalin, etc., with sulphuric or hydrochloric acid, or both, as the case may be; the proximate principle being triturated with ten times its weight of the starch, previous to the application of the acid. With other principles, for instance, strychnia, starch cannot be so applied. Cane sugar may also be used in place of starch, although, in some respects, not with the same satisfactory results, but in both cases the reactions are characteristic. Arch. Ph., March, 1876, p. 233.

Morphia.—A New Reagent.—Prof. E. Selmi takes glacial acetic acid, stirs it up for fifteen minutes with red oxide of lead in fine powder, filters, and places a drop on a plate of glass laid upon white paper. Upon this drop are put 2 or 3 drops of an aqueous solution of acetate of morphia, drying each time at a very gentle heat, so as to have at last a spot formed of the dry acetate of the alkaloid. From the first instant there appears a slight yellowness, which goes on increasing as the acetic acid evaporates, passing into a bright yellow, an orange, and a dark yellow. If left to spontaneous evaporation the yellow gives place to a violet, which grows pale, and finishes by taking the color of the lees of wine. Ch. N., February 18th, 1876, p. 75; from Gazz. Chim. Italiana, 1875, Nos. VII, VIII.

Narcotina.—Action of Water.—Matthiessen and Foster, in the course of a series of experiments on narcotina, has obtained results, which led them to the opinion that by the action of water, either by heating to 150° C. (= 302° F.) in sealed tubes or by prolonged boiling, narcotina is split into meconin and cotarnia, in accordance with the following equation:

$$\overset{\text{Narcotina.}}{C_{22}H_{23}NO_7} = \overset{\text{Meconin.}}{C_{10}H_{10}O_4} + \overset{\text{Cotarnia.}}{C_{12}H_{13}NO_3} \ (O = 16).$$

If oxidizing agents are present, however, the meconin becomes partly or wholly oxidized to opianic acid (and sometimes hemipinic acid). Since then Hesse has shown that in the mother-liquors of opium working for the extraction of alkaloids, there is a base called by him *hydrocotarnia* (see Proceedings, 1873, p. 373, and 1874, p. 267), having the formula $C_{12}H_{15}NO_3$ ($O = 16$). This base he concludes to be formed by the action of water, etc., on narcotina, the reaction being probably expressed by the following equation:

$$\underset{\text{Narcotina.}}{C_{22}H_{23}NO_7} + \underset{\text{Water.}}{H_2O} = \underset{\text{Opianic acid.}}{C_{10}H_{10}O_5} + \underset{\text{Hydrocotarnia.}}{C_{12}H_{15}NO_3} \; (O = 16).$$

Hesse gives, however, no numerical value in support of this view. Nor does it appear from his paper that he has isolated any opianic acid from the product of any such reaction, nor even that he distinctly proved that the base formed was actually hydrocotarnia. Beckett and Wright have undertaken to decide this point, and they decide by their results that the view of Hesse is the only one tenable in the present state of our knowledge. Some of the reactions and decompositions of narcotina are not inconsistent with the views of Matthiessen and Foster, while others are not at all in harmony with their equation. The formation of meconin is possibly due to the splitting up of the opianic acid formed into meconin and hemipinic acid; a reaction which Matthiessen and Foster have shown to take place under certain circumstances.

Cotarnia and Hydrocotarnia.—The authors prepared pure cotarnia by the process of Matthiessen and Foster, which consists in adding quickly to a boiling solution of 2 parts of narcotina in 30 of water and 3 of sulphuric acid, 3 parts of binoxide of manganese at 60 per cent. After cooling and standing for some hours, the liquid is filtered from opianic acid that has crystallized out, nearly neutralized with lime paste, and rendered alkaline by carbonate of sodium. The filtrate contains the whole of the cotarnia, which is obtained in a pure condition by manipulation described at length. The pure cotarnia obtained was converted into hydrocotarnia by the action of nascent hydrogen, 2 molecules of which are assimilated when the alkaloid is treated as follows: The cotarnia is dissolved in dilute hydrochloric acid and treated with granulated zinc, enough acid being added from time to time to keep up a just perceptible effervescence. Too great concentration of the liquid must be avoided by adding enough water, else a bulky mass of crystals consisting of double zinc-chlorides of cotarnia and hydrocotarnia separate; and this separation may also be avoided by gently warming. After two or three days the whole of the cotarnia is thus converted into hydrocotarnia according to the following equation:

$$C_{12}H_{3}NO_3 + H_2 = C_{12}H_{15}NO_3 \ (O = 16);$$

100 parts of crystallized cotarnia yielded to the authors about 85 parts of crude hydrocotarnia, 97 being the theoretical yield. The product is poured into a large excess of ammonia, so as to dissolve all zinc hydrate, and the turbid liquid agitated well with ether. The ethereal solution yields after concentration, and by spontaneous evaporation, fine prisms often an inch in length, which agree in all respects with the hydrocotarnia of Hesse. They are readily soluble in alcohol, ether, and benzin, and can be easily crystallized from the latter solvents.

In an appendix to the paper of Beckett and Wright, Dr. F. Pierce notes the results of some physiological experiments made with cotarnia and hydrocotarnia, from which it appears that the apparently inert cotarnia is by the addition of the hydrogen converted into a very active substance. Doses of 2½ to 5 decigrams of hydrocotarnia produced in kittens, rabbits, and guinea-pigs rapid and well-marked tremors, passing into severe epileptiform convulsions, accompanied apparently by more or less affection of the sensory organs; while 0.5 gram proved fatal with kittens in ten minutes. J. Chem. Soc., July, 1875, pp. 573–585.

Narceina.—It had been previously shown by G. H. Beckett and C. R. Alder Wright, that narceina retains with considerable force a minute quantity of hydrochloric acid, while the neutral hydrochlorate is partially decomposed by contact with water, yielding crystalline basic compounds, of composition depending on the amount of water present. So energetically are the last traces of hydrochloric acid retained, that even precipitation by an alkali and several crystallizations from alcohol fail entirely to remove them. The authors now find that narceina is incapable of forming a neutral sulphate, but that it is capable of forming a bisulphate in presence of a sufficient excess of sulphuric acid, and that this body breaks up in presence of water into more basic salts of indefinite composition, just as the hydrochlorate does. The last portions of sulphuric acid are even less readily removed from these compounds by the action of large quantities of water than are the last portions of hydrochloric acid; but by treatment with carbonate of sodium the sulphate is *completely* decomposed, and *pure narcotina*, free from hydrochloric as well as sulphuric acid, may be obtained. Such gave upon analysis numbers corresponding to the following formula: $C_{23}H_9NO_9$ ($O = 16$). The authors also communicate the results of the action of nascent hydrogen, of acetic acid, and of iodide of ethyl, upon the alkaloid. J. Chem. Soc., Aug. 1875, pp. 699–704.

Opiania.—Identity with Narcotina.—O. Hesse has found that opiania is identical with narcotina. He had received the sample examined from Hinterberger, who had so designated the alkaloid as obtained by Engler from Egyptian opium. The only difference observable is in the form of the crystals, which was distinct from that of the narcotina with which it was compared. This distinction is due, however, to the solvent from which it was crystallized; for when opiania was recrystallized from diluted alcohol it assumed the crystalline form of ordinary narcotina, and, reciprocally, narcotina, when crystallized from strong alcohol, crystallized in the same form as opiania. In its relation to solvents and reagents, and in its elementary composition, opiania also proves to be absolutely identical with narcotina. Ph. Central Halle, No. 7, 1876, p. 52.

Cinchona Alkaloids.—Randall Rickey, in reply to the query, whether the alkaloids of cinchona bark can be extracted in a crude form, yet sufficiently pure to permit a ready detection of adulterants. seems to favor the negative. If such a preparation is desirable, it may be readily made by mixing the pure alkaloids in the proper proportions. Proceedings, 1875.

Detection of Morphia and Strychnia as Contaminant.—The occurrence of morphia or strychnia in some salts of the cinchona alkaloids, on several occasions during the past few years, leads a writer to the suggestion that all smaller parcels of sulphate of quinia, or other cinchona alkaloids, be tested for the poisonous alkaloids. It is usual in Germany to test quinia for the presence of salicin. With this test can be combined the tests for morphia and strychnia, by dissolving 0.3 grams of the quinia in 6 c.c. of pure concentrated sulphuric acid, with gentle agitation. Of the colorless, or slightly yellow solution, 1 c.c. is poured on some fragments of bichromate of potassium. Pure quinia solution remains colorless around the crystals for quite a minute; subsequent color is only due to solution of the bichromate. In presence of strychnia a blue color is immediately developed around the crystals, and this passes into violet, red, and lastly, green. To the remaining solution of quinia four or five drops of solution of nitrate of silver are added, and the whole is gently shaken. If morphia be present a reddish yellow coloration appears immediately; on gently warming this it passes into a deep, turbid red-brown, owing to reduction of the silver. It is true that bodies other than morphia give this reaction, but the appearance of it indicates the questionable character of the sample, which should then be further examined. With hydrochlorate of quinia nitrate of silver, of course, produces a white precipitate, but even in this case the coloration is quite distinct. The tests are applicable to the other cinchona alkaloids. Ch. and Drug., Feb. 1876, p. 42.

Quinia.—Iodosulphate of Chinioidin a Reagent.—Dr. De Vrij recommends iodosulphate of chinioidin for the quantitative and qualitative determination of quinia in a mixture of cinchona alkaloids. A solution in alcohol, containing 16 per cent. of iodosulphate may readily be obtained, and is more convenient than tincture of iodine, an excess of which is liable to produce a compound containing too much iodine. To determine the quantity of quinia contained in the mixed alkaloids obtained from a sample of cinchona bark, 1 part of the alkaloids is dissolved in 20 parts of alcohol of 90 or 92 per cent., containing 1.6 per cent. of sulphuric acid. From the solution of acid sulphates so obtained, the quinia is separated by adding carefully, by means of a pippete, solution of iodosulphate of chinioidin, as long as a dark-brown red precipitate of herapathite is formed. As soon as all the quinia has been thus precipitated, and a slight excess of the reagent has been added, the liquor acquires an intense yellow color. The beaker containing the liquor with the precipitate is now covered by a watch-glass, heated on a water-bath until it begins to boil, allowed to cool, and weighed, in order that a correction may subsequently be made for the small amount of herapathite dissolved (92 per cent. alcohol is capable of taking up at 24.5° C. (= 76.1° F.) 0.133 per cent. of herapathite). The herapathite is now collected on a weighed filter, is washed with a saturated solution of herapathite (made by acting on an excess of iodosulphate of quinia in 92 per cent. alcohol), and when completely drained the funnel, moist filter, and contents are weighed, and the filter allowed to dry. When completely dry the weight is again taken and the quantity of herapathite on the filter, as well as the quantity retained in solution by the filtrate, are ascertained. The weight of the solution of herapathite retained by the moist filter is then deducted from the weight of the original solution, the quantity of herapathite in it calculated, and added to the quantity of dry herapathite obtained. 1 part of herapathite dried at 100° C. (= 212° F.) represents 0.5509 parts of anhydrous quinia, or 0.7345 parts of pure commercial disulphate. The solution of

Iodosulphate of Chinioidin is prepared from sulphate of chinioidin (wrongly called "sulphate of amorphous quinine," but introduced into commerce by Messrs. Howard & Sons, under that name) as follows: 2 parts of the salt are dissolved in 8 parts of water, containing 5 per cent. of sulphuric acid. To the *clear* solution, contained in a large capsule, a solution of 1 part of iodine and 2 parts of iodide of potassium in 100 parts of water is *slowly* added under continuous stirring, so that no part of the solution of chinioidin comes in contact with an excess of iodine. The orange-colored precipitate collapses, either spontaneously or upon slight elevation of temperature, into a dark brown-red resinous substance, whilst the supernatant liquid is but slightly colored. The substance is washed by heating on a water-bath with water, dried at the temperature of the water-bath, and is then dissolved by the aid of heat in six parts of 92–94 per cent. alcohol, the solution is allowed to cool, decanted or filtered from the sediment formed, and evaporated to dryness. The dry mass is dissolved in 5 parts of cold alcohol, and when filtered from a small portion of undissolved substance, constitutes the new reagent. Ph. J. Trans., December 11th, 1875.

Sulphate of Quinia.—According to B. Lindeman, Kerner's test* does not afford a clear solution with sulphate of quinia of undoubted purity, unless the following points are regarded: 1. That the temperature of the water not exceed 60° F. 2. That the water of ammonia have the right sp. gr. 3. That the test-tube be only turned up and down and not shaken violently. A. J. Ph., December, 1875, p. 537; from Arch. for Ph., 1875, 328.

Salicylate of Quinia.—Jul. Jobst has obtained salicylate of quinia in the form of a curdy precipitate by double decomposition between solutions of salicylate of ammonium and of hydrochlorate of quinia. The curdy precipitate is soluble in alcohol, and from such solution the salicylate is obtained in handsome crystals, which are anhydrous. It requires 225 parts of water, 120 parts of ether, or 20 parts of 90 per cent. alcohol for solution.

Compounds of Phenol with Neutral Salts of Quinia.—Jul. Jobst

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* Kerner's test will be found in A. J. Ph., 1862, pp. 417 and 426.

and O. Hesse have found that when an equivalent of carbolic acid is added to a hot aqueous solution of neutral sulphate of quinia, crystals of

Sulphophenate of Quinia are deposited upon the cooling of the solution. By a single recrystallization from alcohol the compound is obtained pure, forming handsome, white, glistening prisms, which are readily soluble in boiling water and in boiling alcohol. The salt requires, at 15° C. (= 59° F.), 680 parts of water, and 74 parts of 80 per cent. alcohol. Ether and pure chloroform dissolve mere traces. Heated to 100° C. (= 212° F.) it loses only water of crystallization, but at 130° C. (= 266° F.) it loses some carbolic acid. By substituting hydrochlorate for sulphate of quinia, in the above process,

Phenol-chlorhydrate of Quinia is formed, and may be obtained pure, in white prisms, by simple recrystallization. This salt is freely soluble in hot water and alcohol, requires 101 parts of water or 4 parts of 80 per cent. alcohol at 15° C. (= 59° F.), and is but very sparingly dissolved by ether. It loses carbolic acid between 100° and 120° C. (= 212° and 248° F.). In the same manner

Phenol-bromhydrate of Quinia was obtained, which crystallizes in handsome white prisms. Ph. Centr. Halle, No. 21, 1876, p. 178; Ibid., 34, 1875, p. 281. (Carbolized or phenylated sulphate, etc., of quinia are names preferable to those given.)

Carbolized Sulphate of Quinia.—S. Cotton has obtained a compound of sulphate of quinia with carbolic acid, which in contradistinction to the officinal *Sulfophénate de Quinine*, he has named *Sulfate de Quinine Phénaté.* It is formed when a saturated solution of sulphate of quinia, which gives no crystallization on cooling, is mixed with an equal quantity of an alcoholic solution of carbolic acid; crystals soon appear and rapidly increase in quantity. The new compound is stated to be free from the odor of carbolic acid, which also loses its caustic character, and it possesses a further advantage in its solubility in water. Ch. and Drug., February 15th, 1876, p. 41.

Conchinia (Pasteur's Quinidia).—Jul. Jobst communicates the results of numerous therapeutic experiments, made with "conchinia salts" in the Military Hospital of Milan by Dr. R. Macchiavelli, which seem to prove that the therapeutic value of conchinia is equal to that of quinia in the treatment of malarial disease, and that its salts possess the further advantage in that they are more soluble than are the salts of quinia, and in not producing any narcotic effect, or but to a very slight degree when administered to feeble and hysterical individuals.

Jobst states further that most of the cinchona barks worked up by the manufacturers contain mere traces of conchinia; that this, however, accumulates in the chinoidin of the quinia manufacturers, and that chinoidin is, therefore, its most productive source.* To separate it from this source powdered chinoidin is exhausted with ether, the solution is evaporated, the residue is dissolved in dilute sulphuric acid, neutralized with ammonia, and mixed with a solution of tartrate of sodium and potassium as long as a crystalline precipitate is produced. This precipitate is composed of a mixture of tartrate of quinia and cinchonidia.† The filtrate is then decolorized with charcoal mixed with solution of iodide of potassium, and allowed to rest. Pulverulent iodide of conchinia separates, is decomposed with ammonia, and crystallized from alcohol.

Conchinia is isomeric with quinia, crystallizes from alcohol in efflorescing prisms, has a composition of $C_{20}H_{24}N_2O_2 + 2\frac{1}{2}H_2O$ ($O = 16$), is soluble in 2000 parts of water at 15° C. (= 59° F.), 26 parts of 80 per cent. alcohol at 20° C. (= 68° F.), and in 22 parts of ether at 20° C. (= 68° F.). From its ethereal solution it crystallizes in rhomboidal and prismatic crystals, which are arranged in cauliflower-like groups. With chlorine and ammonia-water it produces the green color like quinia, while in its optical relations it is more like cinchonia. When its salts are carefully heated they are converted into salts of quinicia.

Neutral Sulphate of Conchinia ($2C_{20}H_{24}N_2O_2.SH_2O_4 + 2\frac{1}{2}H_2O$ ($O = 16$)).—When made on a large scale it forms soft asbestos-like tufts of crystals, which are much handsomer and lighter than the sulphates of any of the other cinchona alkaloids. The crystals retain their brightness in dry air, and this property, as well as its ready solubility in chloroform, distinguishes it from the corresponding sulphates of quinia and cinchonidia. It requires 108 parts of water at 10° C. (= 50° F.) for solution.

Neutral Hydrochlorate of Conchinia ($C_{20}H_{24}N_2O_2HCl, + H_2O$

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* This source was already drawn attention to by De Vrij (see Proceedings, 1873, p. 379).

† De Vrij obtained bitartrate of quinidia by heating chinoidin with tartaric acid solution in excess, the method depending on the sparing solubility of the bitartrate formed. Ibid.

($O = 16$)).—It crystallizes from saturated solutions in asbestos-like prisms, which are readily soluble in alcohol, insoluble in ether, and require 60 parts of water at 10° C. (= 50° F.) for solution.

Neutral Hydriodate of Conchinia ($C_{20}H_{24}N_2O_2HI$ ($O = 16$)).—This is the compound formed during the preparation of the alkaloid from chinoidin. It is very sparingly soluble both in water and in alcohol.

Tartrate of Conchinia and Antimony ($C_{20}H_{24}N_2O_2,C_4H_5(SbO)O_6$) is deposited in well-crystallized form when the free alkaloid is boiled with solution of tartar emetic. N. Rep. Pharm., No. 5, 1875, pp. 257–272.

Quinicia and Cinchonicia.—O. Hesse has undertaken some fresh investigations of these two basic substances, concerning the nature of which some uncertainty exists, from which it appears that the formulas—$C_{20}H_{24}N_2O_2$ for quinicia, and $C_{20}H_{24}N_2O$ ($O = 16$) for cinchonicia, are probably correct. He finds no obstacle to the conclusion that these bases are polymeres of the respective original bases.

Quinicia is most readily obtained from bisulphate of quinia. This salt gives its water of crystallization at 100° C. (= 212° F.) without melting; it may then be powdered finely, and when heated to 135° C. (= 275° F.) it melts, and is completely converted into its isomere, bisulphate of quinicia. Bisulphate of quinidia may be substituted for the quinia salt with precisely the same results. The brownish-yellow fused mass obtained from either salt requires purification. This is done by dissolving it in a little water and neutralizing with ammonia; after two or three days' standing the neutral sulphate of quinicia crystallizes out, forming an almost solid mass, from which the mother-liquor is removed by pressure, and the salt may be recrystallized from chloroform containing alcohol. The author prefers, however, to completely precipitate the solution of the fused mass by ammonia, to dissolve the precipitated quinicia in ether, and to add oxalic acid to neutrality, when oxalate of quinicia will crystallize out at once. To further purify this, it is recrystallized once from boiling chloroform and once from 97 per cent. (by volume) alcohol. Finally, this salt is precipitated with caustic soda, taken up by ether, and dried in an exsiccator. So obtained quinicia is faintly yellowish and amorphous; readily soluble in alcohol, chloroform, and ether; less soluble in water; forms salts with acids which are generally well crystallizable, and are very light-yellow or reddish colored. Like quinia and quinidia (conchinia) its solutions give a green color with chlorine-water and ammonia, but the color is less intense. It specially differs from these two bases by giving, when dissolved in *weak* hydrochloric acid, a white amorphous precipitate upon the addition of solution of chlorinated sodium or chlorinated lime. In very acid solution this precipitate is not formed. The author describes the formation and properties of *acid and neutral sulphate of quinicia*, *the oxalate*, *hydriodate*, and *sulphocyanate*, the double *hydrochlorates of quinicia* with *mercury*, with *gold*, and with *platinum*.

Cinchonicia is prepared by the author from the bisulphates of cinchonia and cinchonidia by a method identical in all essentials with that for preparing quinicia. As obtained, it appears as a faintly yellowish viscous substance, which can be drawn out into colorless threads. It readily liquefies at about 50° C. (= 122° F.); at 80° C. (= 176° F.) it is colored brown, and finally forms a dark-brown substance similar in color to chinoidine, especially if the temperature be raised to 100° C. (= 212° F.), or higher. Upon cooling it remains soft. It dissolves easily in alcohol, ether, chloroform, aceton, and benzol. Its alcoholic solution is bitter, and has a strong basic reaction. Chlorine and ammonia give no color. With Labarraque's solution, or solution of chlorinated lime, its solution in hydrochloric acid gives a white, flocculent, resinous precipitate, which is not colored by ammonia. Neither cinchonia nor cinchonidia in weak acid solution give precipitates with the chlorinated solutions. The *oxalate*, *hydriodate*, *sulphocyanate*, and the double compounds of the *hydrochlorate of the alkaloid* with *mercury*, *gold*, *and platinum*, are also described. Finally, the author describes the behavior of solutions of quinicia and of cinchonicia to polarized light. Ph. J. Trans., December 18th, 1876, p. 482.

Brucia.—Conversion into Strychnia.—Prof. Sonnenschein's statement, that brucia is, by the action of nitric acid, converted into strychnia (see Proceedings, 1875, p. 419), is not corroborated by the experiments of A. J. Cownley, who finds,

1. That if brucia is treated with enough dilute nitric acid to acidify the solution, there is no change in color, and caustic fixed alkalies precipitate the alkaloid.

2. If enough acid be used just to form the blood-red color without the aid of heat, there is a partial precipitation with alkali.

3. If gentle heat be used in presence of acid in excess, more than sufficient to color the solution, caustic potassa or soda fails to pro-

duce a precipitation, and if further heat be used after the acid has been added, yellow crystals soluble in alkali are deposited.

These experiments seem to bear out the view that if the action of dilute acid be completed, the alkaloid is converted into a nitro-base. On this point Strecker has shown (Compt. Rend., xxxix, 49), agreeing to some extent with Gerhardt and Rosengarten, that the result of the action of strong nitric acid on brucia is to convert it into a nitro-compound, cacotheline (Laurent) of the composition of $C_{20}H_{22}N_4O_9$, expressing the reaction as

$$C_{23}H_{26}N_2O_4 + 5NO_3H = C_{20}H_{22}N_4O_9 + N(CH_3)O_2 + C_2H_2O_4 + 2NO + 2OH_2\ (O = 16),$$

carbonic acid being finally evolved by the splitting up of the molecule of oxalic acid.

The author is inclined to the opinion that Sonnenschein has operated upon brucia containing strychnia, indication of the latter having been admitted by that author in the brucia experimented with. It is important to observe that the detection of brucia especially, and even of strychnia, in an analytical inquiry, will become doubtful, if the presence of nitric acid, even dilute, be permitted. Ph. J. Trans., April 22d, 1876, p. 841.

Crystallized Hyoscyamia.—Thibault had endeavored to obtain crystallized hyoscyamia by the methods of the German authors, but failed even with those recommended by Staas and by Duquesnel. He thereupon used solution of iodine in iodide of potassium, which Bouchardat had already employed successfully for isolating certain alkaloids, and succeeded in obtaining a satisfactory product. The ground hyoscyamus seeds, after having been deprived of fixed oil by bisulphide of carbon, and dried at 30–35° C. (= 86–95° F.), are reduced to a fine powder, macerated in a 2–3 per cent. solution of tartaric acid for two days, and exhausted at a temperature of 10–15° C. (= 50–59° F.). The liquid is then precipitated with a solution of 15.0 iodide of potassium and 7.5 iodine to 250.0 water, the precipitate collected upon a filter, washed with water, and dissolved in a little water by the aid of sulphuric acid. The solution is then treated with calcined magnesia, which, even in excess, does not change the alkaloid, is then dried at 30–35° C. (= 86–95° F.), and extracted with alcohol of 95 per cent. The alcohol is distilled off in vacuo, the light-colored residue is treated with pure dry chloroform to remove any iodide of magnesium (and the chloroformic solution evaporated ?). The sticky mass remaining is treated with sulphuric acid diluted with as little water as possible, agitated with chloroform to remove remaining impurity, the aqueous solution of sulphate of hyoscyamia filtered, treated with potassa in slight excess, and shaken with chloroform, and rapidly decanted, repeating this twice. The chloroformic solution then yields upon spontaneous evaporation colorless, silky crystals of hyoscyamia, arranged in stellate groups, and a portion of the alkaloid in a sticky colorless and amorphous condition, but otherwise identical with the crystals.

So obtained hyoscyamia possesses a faint odor, a sharp, pungent taste, and decided alkaline reaction, yields crystalline salts with acids, is sufficiently soluble in water to render it alkaline, freely soluble in alcohol and in ether, but most soluble in chloroform. It is precipitated chocolate-brown by iodine in iodide of potassium, greenish white by iodohydrargyrate of potassium, orange-yellow by iodide of bismuth and potassium, and grayish by tannin. It melts at 90° C. (= 194° F.), forming a brownish liquid, and, when heated on platinum, is volatilized without residue.

The author's hyoscyamia from the "seeds" is different from the "commercial hyoscyamia" in all its characters, but from the "leaves" he obtained a product which resembled in its odor that of the commercial alkaloid. Arch. Ph., July, 1875, p. 74; from Rép. de Pharm.

Aconite Alkaloids.—C. R. Alder Wright has investigated and determined the ultimate composition of some of the aconite alkaloids, prepared by T. B. Groves, as previously described in the "Year-book of Pharmacy." The alkaloids investigated were,

A. Hydrochlorate of a new base, believed by Mr. Groves to be identical with the atisine of Boughton. Mr. Wright obtained numbers from which the formula $C_{31}H_{45}NO_{10}$ ($O = 16$) is calculated, which manifestly does not agree with that of "atisine" ($C_{46}H_{74}N_2O_5$ ($O = 16$)).

B. Impure nitrate of aconitia from *Aconitum napellus*.

C. Purified nitrate of aconitia from another batch of roots of *A. napellus*. Specimen B was purified by several recrystallizations. The number obtained with the specimen agree most nearly with the formula $C_{33}H_{45}NO_{11}$, while those of specimen C seem to indicate a somewhat lower molecular weight, the formula being intermediate between $C_{32}H_{43}NO_{11}$ and $C_{32}H_{43}NO_{10}$ ($O = 16$). It remains an open question whether this difference between the aconitias of the same species of aconite is attributable to changes produced in the processes of extraction or not. It is regarded as clearly demonstrated, however, that either through the natural presence in *Aconitum napellus* of more than one alkaloid forming well-crystallized salts, or through changes produced in the alkaloid by the methods of extraction adopted, the crystallized nitrate of aconitia thence obtained is liable to consist of a mixture of at least two distinct salts, one of which, if not absolutely inert, is very much less active than the other.

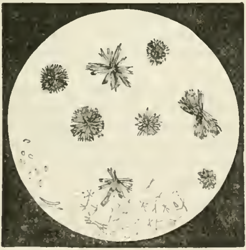
D and E, specimens of *pseudo-aconitia* from *Aconitum ferox*, prepared from different batches of roots. Pseudo-aconitia has a composition different from that of either aconitia or the base A. The composition of D was found to correspond to the formula $C_{36}H_{49}NO_{11}$; with E results, in some respects different from D, were obtained, but for the want of further material a formula could not be established. As with aconitia, further experiment is essential before it can be decided whether these different results are due to difference in the alkaloid contained in the roots, or alterations in the base or bases originally present during the process of extraction. Ph. J. Trans., September 4th, 1875; from Proc. Br. Ph. Conference.

Alkaloids of Veratrum Viride and Veratrum Album.—T. G. Wormley finds, as the result of repeated experiments, that both Veratrum viride and Veratrum album contain an alkaloid, which, when pure, in its behavior with the mineral acids and with liquid precipitants, *fully responds to all the reactions of veratria or veratrin.* Thus in the solid state, under the action of concentrated sulphuric acid, the alkaloid from both plants assumes a yellow color, and slowly dissolves to a yellow or reddish-yellow solution, which after a time becomes orange-red, and finally deep crimson with a purplish hue. If the mixture be gently warmed, the crimson coloration manifests itself at once. If the alkaloid is impure, at least, if it contains an apparently oily matter which adheres most tenaciously, it will strike a more or less red color with sulphuric acid and quickly dissolve to a reddish-yellow solution, which after a time acquires a more or less brownish-red color, but fails to assume the crimson coloration of the pure alkaloid. The presence of pure jervia in very minute quantity does not appear to materially interfere with the normal reaction of the alkaloid with this acid. It has been claimed that "veratralbia" differed from "veratria and veratroidia," in that its solution failed to yield a precipitate with chloride of platinum. The author finds that solutions of each of the so-called different principles, when of the same strength and under like conditions, if not too dilute, will yield precipitates that can in no way be distinguished.

The alkaloids of *Veratrum viride* were prepared from a fluid extract of the root, by Sharp & Dohme, of Baltimore, as follows:

The fluid extract, acidulated with acetic acid in the proportion of 15♏ per fluid ounce, is added, with constant stirring, to eight volumes of pure water, the mixture allowed to stand until the precipitate has completely subsided and the liquid filtered. The filtrate is concentrated to about one-half the volume of the fluid extract employed, is again filtered after cooling, and is precipitated with a slight excess of carbonate of sodium. The voluminous precipitate formed is then removed by agitating the mixture twice successively with its volume of ether sp. gr. 0.725, which under these conditions also takes up the jervia, notwithstanding its sparing solubility in ether when pure. The ethereal solution of the mixed alkaloids is allowed to evaporate, in small portions at a time, in a rather deep, thin glass capsule, and the residue is dried in a water-oven. The outer or upper portion of the residue thus obtained will consist chiefly of *veratria*, in the form of a transparent, more or less yellowish, vitreous mass, in which under the microscope may be found some scattered crystals of jervia; in drying, this portion of the deposit generally separates, in part at least, from the sides of the capsule, in the form of transparent scales. The central or inner portion of the deposit will consist chiefly of *jervia* in the form of bold groups of crystals, as illustrated by Fig. 43, magnified 30 diameters.

Fig. 43.



Separation of Veratria.—The dried residue of mixed alkaloids (amounting to about 2 grains for each fluid ounce of the fluid extract) is treated with a little water strongly acidulated with hydrochloric acid (1 : 10), which dissolves the veratria, and converts the jervia into insoluble chloride, about a fluid drachm of acidulated water being used for every 2 grains of alkaloids. The mixture is transferred to a moist filter, the filtrate used for washing the undissolved portion on the filter until all has been so removed from the capsule, and the filter is then washed with a little acidulated water. The veratria in the filtrate is further purified by washing the acid solution with ether, precipitating with carbonate of sodium, and taking up the precipitate by agitation with ether; this treatment being repeated until the residue left by the ether, when pulverized, forms a sparkling white powder.

Separation of Jervia.—The residue in the filter, remaining after the separation of the veratria, is pulverized, boiled for some time with carbonate of sodium, the liberated jervia is washed with a little water, and treated on the filter with water, strongly acidulated with acetic acid, which dissolves the jervia. From the clear solution the jervia is again precipitated by carbonate of sodium, and the precipitate extracted by agitation with chloroform, which on evaporation leaves the alkaloid in the form of a hard, transparent, amorphous deposit. On moistening this residue with a few drops of water, containing a drop or two of alcohol, it will be quickly converted into a white mass of groups of crystals of the pure alkaloid.

The alkaloids of *Veratrum album* may be obtained from the powdered root by extraction with water acidulated with acetic acid. and treating the concentrated solution precisely as in the case of the same solution from the fluid extract of Veratrum viride, the ether extract of the mixed alkaloids presenting the same crystalline form as that obtained from Veratrum viride.

Reactions of Jervia.—*Sulphuric Acid* causes pure jervia to assume a yellow color, and slowly dissolves it to a yellow or faintly reddish-yellow solution; this after some minutes acquires a beautiful bright green color, which disappears after a few hours, and a dirty white or brownish precipitate separates. A very minute quantity of the alkaloid exhibits this color reaction, and the same reaction is produced with the chloride, sulphate and acetate of the alkaloid, when in the solid state; but with the nitrates an orange-red color is produced, which is permanent for some hours.

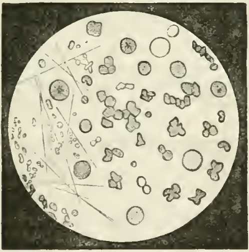
Nitric Acid quickly dissolves the alkaloid to a colorless solution, which after a time acquires a more or less rose or pinkish hue.

Hydrochloric Acid immediately forms chloride, which is insoluble in the presence of free acid, although somewhat soluble in pure water.

A solution of the acetate of jervia, containing 1 part in 100, occasions the following reactions:

1. *Sulphuric Acid*, diluted 1 : 5, produces an immediate turbidity, and in a few moments a dense, dull white amorphous precipitate, which soon becomes more or less granular. After a time, the deposit consists of more or less circular, nodular masses, and especially along the margin of the deposit, fine groups of long, very delicate crystalline needles, which are exhibited under a magnifying power of 75 diameters in Fig. 44. The circular masses generally appear under the microscope of a brownish color. The reaction is quite peculiar to jervia.

FIG. 44.



2. *Nitric Acid*, of sp. gr. 1.20, occasions an immediate, copious precipitate, which in a little time becomes converted into nodular masses, some of which are spinated; but if the jervia solution contains free acetic acid, especially if a minute drop be added after the reagent, the precipitate soon becomes converted into a mass of crystals of the form illustrated by Fig. 45, magnified 75 diameters.

Nitrate of Potassium[*] produces an immediate turbidity in the

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[*] Mr. Bullock's paper on Jervia came to hand about the time the author had completed his experiments.

neutral solution, and after a little time a quite good deposit of granules and crystalline masses. In the presence of free acetic acid much the same result is produced as with free nitric acid.

FIG. 45.

3. *Hydrochloric Acid* produces an immediate, copious, dull-white, amorphous precipitate, which becomes more or less granular.

4. *Bromine in hydrobromic acid* throws down a dense, curdy, yellow precipitate, which is readily soluble in alcohol, and deposited from this, on spontaneous evaporation, in granular form.

FIG. 46.

5. *Platinic Chloride* produces a deep yellow precipitate, which becomes lighter in color, and more or less granular.

6. *Auric Chloride* occasions a light yellow, curdy precipitate. The author introduces his paper by a concise review of the literature on the veratrum alkaloids, and concludes with a series of experiments, made in order to determine in how far these alkaloids could be individually recovered from complex mixtures, such as the stomach and blood of animals, etc. Fig. 46 shows the jervia magnified 75 diameters, as obtained from the blood of a cat which had been killed by the administration of 2 drachms of fluid extract of Veratrum viride. A. J. Ph., January, 1876, pp. 1 to 10.

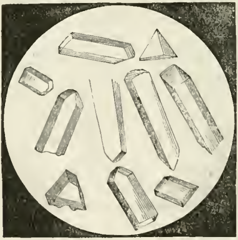
Jervia.—C. Bullock, after reviewing the history of this alkaloid, gives the method by which he has recently obtained it from Veratrum viride, and describes the product as follows: From its alcoholic solution it crystallizes in small prismatic crystals, which, when viewed in water under a magnifying power of 500 diameters, present the forms shown in Fig. 47. It is very sparingly soluble in dilute alcohol and in ether. The acetate and phosphate are soluble, the sulphate, muriate, and nitrate sparingly soluble in water. From its acetic solutions it is precipitated by caustic alkalies, the precipitate being insoluble in excess, and appearing amorphous at first, under the microscope, after twenty-four hours showing, however, a disposition to structural arrangement. Alkaline carbonates in slight excess do not precipitate weak solutions of the acetate in the cold; but a large excess or heat causes a precipita-

FIG. 47.

tion. Carbonate of potassium added to a cold acid solution of acetate of jervia to exact neutralization, causes a precipitate after standing in a warm place; carbonic acid escapes, and at the end of twelve hours round, dumb-bell-shaped and stellate arrangements, throwing out prismatic crystals, appear. Alkaline bicarbonates show in the main the same reaction as the carbonates; under the microscope a more advanced crystalline arrangement appears than occurs when the neutral carbonates are used as precipitant. Its acetic solution is precipitated by sulphuric, nitric, and muriatic acids and their salts; sulphuric acid and sulphates reacting slowly, while with hydrochloric acid or chlorides the precipitation is more prompt, especially if the liquid is vigorously stirred, and nitric acid and nitrates produce an immediate precipitate, the precipitate being almost completely in excess of solution of nitrate of potassium insoluble. This insolubility affords a ready method of separating jervia from veratroidia.

Nitrate of Jervia is precipitated from dilute acetic solutions in a crystalline form. It is soluble in 266 parts of water, and in 247 parts of alcohol at 70° F.; but is more soluble in dilute alcohol, from which it crystallizes in prismatic crystals, which, when viewed in water under a magnifying power of 500 diameters, present the appearance shown in Fig. 48.

FIG. 48.



Muriate of Jervia appears amorphous immediately after precipitation; after standing assumes a crystalline formation, and is more disposed towards distinct crystallization when precipitated by hydrochloric acid than by neutral chlorides.

Sulphate of Jervia, when precipitated by sulphuric acid, is a granular powder, while the precipitate produced by neutral sulphates, upon standing, has a disposition to crystallize in wheel-shaped forms. It requires 427 parts of water and 182 parts of alcohol at 70° F. for solution, and crystallizes from alcoholic solutions in prismatic crystals.

The most characteristic test for jervia seems to be the insolubility of the nitrate in solution of nitrate of potassium. A. J. Ph., October, 1875, pp. 449–454.

In the April number (1876) of the same journal (pp. 147 to 153) Mr. Charles Bullock communicates some additional investigations, by which he seems to prove *the absence of veratria in Veratrum viride.* Jervia is the only alkaloid present in the root of Veratrum viride. The so-called *veratroidia* is a mixture of jervia with a light-colored resin, which seems to possess the property of rendering the jervia soluble in ether; the larger the amount of resin present the greater will be the proportion of jervia taken up. The reaction with sulphuric acid, hitherto considered to indicate the presence of veratria, is due to a resin which is taken up by the ether, and which adheres with great persistence to the alkaloid, dissolving and precipitating with it. Regarding the preparation of

Jervia, the author states that it may be obtained entirely white, by digesting the nitrate with solution of caustic soda, washing the precipitated jervia, redissolving in acetic acid, reprecipitating by soda, dissolving in hot alcohol, evaporating and crystallizing. It crystallizes in white prismatic crystals resembling sulphate of morphia. These crystals fuse at 380° to 385° F., and are insoluble in ether. Jervia is precipitated completely, from its acetic solution, by the alkalies, including ammonia, and is insoluble in excess of the precipitant.

Finally, the author states that he has examined the "veratria" obtained by J. Scattergood in 1862, and finds it to be jervia mixed with the peculiar resin which gives a mahogany color with sulphuric acid, and that it corresponds with the product called "veratroidia."

Caffeia.—A. Commaille obtains caffeia as follows: 5 grams of powdered coffee—passed through a No. 60 hair cloth sieve—is intimately mixed with 1 gram of magnesia and sufficient water to form a paste, which is allowed to stand 24 hours, becoming yellow and eventually green by contact with the air. It is then dried over boiling water, powdered, and exhausted by three times successively boiling for half an hour with anhydrous chloroform, which need not exceed altogether 100 grams. The chloroform is distilled off from the perfectly colorless solution, and a slightly colored mass, composed of fatty and waxy matter and the caffeia, remains. To separate the first two, the mass is boiled three times successively with water and some finely-powdered glass (about 10 grams), uniting the filtrates and evaporating the solution of pure caffeia. Experiments made on the solubility of the alkaloid lead to the following results:

100 grams of	At 15 to 17° C. (= 59 to 62.6° F.).	At 100° C. (= 212° F.).
Chloroform,	12.9700	19.020
Alcohol (85°),	2.3000	.....
Water,	1.3500	45.550
Pure Alcohol,	0.6100	3.120
Ether (common),	0.1900	.....
Bisulphide of Carbon,	0.0585	0.454
Ether (anhydrous),	0.0437	0.360
Petroleum Essence,	0.0250	.....

Ch. N., Dec. 3d, 1875, p. 271; Compt. Rend., Nov. 8th, 1875.

Colchicia.—Professor Flückiger has observed that if, to an aqueous solution of colchicia, iodohydrargyrate of potassium is added, a faint whitish turbidity and eventual precipitation is produced; the liquid upon standing becomes clear, and if decanted or filtered from the precipitate will then produce an immediate light-yellow precipitate upon the addition of hydrochloric, nitric, phosphoric, or sulphuric acids. Organic acids do not produce this effect, but the mineral acids beforementioned will immediately produce the precipitate in solutions which have been acidulated with organic acids. It seems therefore probable that colchicia may be made available for detecting the presence of free mineral acids in organic acids. A solution of colchicia, sufficiently pure for this purpose, is recommended by the author to be prepared as follows: A few grams of the whole seed are boiled with three parts of water, the solution is concentrated to a syrupy consistence, and the syrupy residue is treated, while warm, with sufficient absolute alcohol to cause an abundant glutinous precipitate. After resting, the alcoholic solution is decanted, evaporated, and the residue dissolved in so much water as is required to make the original weight of the seed. This solution contains sufficient colchicia to produce the reactions above explained. The observation that iodohydrargyrate of potassium affords a slight precipitation independent of the addition of a mineral acid, leads the author to infer that *a second alkaloid may exist in colchicum seed.* N. Rep. Ph., No. 1, 1876, p. 18.

Emetia.—New Process for its Preparation.—A. Glénard communicated recently to the French Academy some preliminary results of an investigation of the alkaloid of ipecacuanha, in which he details a new process for the extraction of emetia, and the preparation of its crystallized hydrochlorate. The production of the latter is worthy of notice, since it has hitherto been generally maintained that emetia is incapable of forming crystallizable salts. The process for obtaining the alkaloid consists in treating either the powder or extract mixed with lime, or the precipitate obtained by the addition of lime to an extraction of ipecacuanha with cold acidulated water, with ether, which extracts the liberated alkaloid. The ethereal solution yields the alkaloid to acidulated water, and the aqueous solution of the acid salt is precipitated by the addition of ammonia, yielding the alkaloid nearly colorless and much more pure than that produced by the processes ordinarily employed. To obtain it entirely pure,

Crystallized hydrochlorate of emetia must first be prepared. This is formed when water acidulated with hydrochloric acid is employed to remove the emetia from the ether, when a solution is obtained, which, when sufficiently concentrated by evaporation, forms a nearly colorless, crystalline mass. The mother-liquors are expressed, the crystalline magma is recrystallized, and perfectly pure hydrochlorate obtained in the form of extremely delicate needles. From its aqueous solution the *pure* emetia is obtained by precipitation with ammonia, but it is a singular fact that all the emetia cannot be thus precipitated. This the author believes to be due to a decomposing action of the emetia upon the hydrochlorate of ammonium, whereby a double hydrochlorate of emetia and ammonium is produced. The composition of emetia is found to correspond to the formula $= C_{30}H_{22}NO_4$; of the hydrochlorate $= C_{30}H_{22}NO_4,HCl$. Ph. J. Trans., September 11th, 1875; from J. de Pharm. et de Chim., September, 1875.

Ergotinia (Ergotinin).—New Alkaloid of Ergot of Rye.—Ch. Tanret has isolated a new alkaloid, which he believes to be the active principle, and to the instability of which he attributes the rapid alteration of powdered ergot. It is a fixed solid, exists only in small amount, and is very readily affected by the air, which renders its extraction difficult. It has alkaline reaction, saturates acids, precipitates with iodohydrargyrate of potassium. phosphomolybdic acid, ioduretted iodide of potassium, tannic acid, chloride of gold, chloride of platinum, and bromine-water. Its most striking reaction is the color which it gives with moderately concentrated sulphuric acid,—a yellowish-red, which becomes intense violet-blue, but loses its distinctness when the alkaloid has been exposed to the air for a few minutes, and finally is no longer produced. Its saline solutions, on exposure to air, quickly become rose-colored, and then red. Ch. N., December 10th, 1875, p. 282; from Compt. Rend., November 15th, 1875.

Ditamina.—Among other interesting components of dita bark (which see) J. Jobst and O. Hesse have isolated an alkaloid, which, being distinct from the *ditaïna* of Gruppe (see Proceedings, 1874, p. 277), the existence of which they doubt, they have named *ditamina* (ditamin). It was obtained from the powdered bark, which had previously been treated with petroleum ether to remove fatty and resinous constituents, by boiling with alcohol, adding water to the yellow tincture, distilling off the alcohol, filtering the residual aqueous fluid to remove a small quantity of green resinous matter, adding solution of soda in excess, and agitating with ether, which dissolves the liberated ditamina. From the ethereal solution the alkaloid is now removed by agitation with dilute acetic acid, the acetic solution is treated with small portions of animal charcoal, and the faintly yellowish-colored solution precipitated by ammonia, a white, flocculent, amorphous precipitate, amounting to about 0.02 per cent. of the bark used, being obtained. As so obtained, ditamina formed, on drying, a white, faintly bitter substance, which is readily dissolved by ether, chloroform, benzin, (benzol ?), and alcohol, and, on evaporation, separates from such solutions in an amorphous condition. Petroleum ether dissolves it with more difficulty, but appears to yield it in a crystalline state under certain conditions; but the structure of the warty aggregations of crystals was not determined with certainty. It evidently exists in the drug in combination with an acid, the nature of which has, however, not been determined (see Dita Bark). It neutralizes acids, forming extremely bitter solutions, and its alcoholic solutions restore red litmus to blue. It is dissolved by concentrated sulphuric acid with a reddish color, changing to violet upon heating, but the reaction is not very sensitive. Concentrated nitric acid dissolves it with a yellow color, and when the solution is moderately heated it changes to dark-green and then orange-yellow, red fumes being evolved at the same time. It melts in a capillary tube at 75° C. (= 167° F.), forming a yellowish fluid, which at about 130° C. (= 266° F.) changes to brown-red. The only salt prepared and examined by the authors is the hydrochlorate. This was obtained from alcoholic solution in the form of a faint-yellow, varnish-like mass, but when its aqueous solution was permitted to evaporate spontaneously it gave some evidences of a disposition to crystallize. Under certain conditions, not yet understood by the authors, it was obtained in colorless needles, which were readily soluble in water and in alcohol. The following reactions were made with the hydrochlorate:

Bichloride of platinum, a yellow amorphous precipitate, soluble upon heating, reprecipitated upon cooling; *chloride of gold*, a dirty yellow flocculent precipitate, which melted upon heating to an oily layer; bichloride of mercury, a white amorphous precipitate, which is redissolved upon heating, and on cooling separates again in warty crystalline groups; *iodohydrargyrate of potassium*, a white amorphous precipitate, with difficulty soluble in cold, readily soluble in hot, water; *sesquichloride of iron*, no change; *sulphocyanide of potassium*, a precipitate in concentrated solution, which disappears on dilution; `*tannin*, a white flocculent precipitate; *phosphomolybdic acid*, a copious white precipitate.

The small quantity of alkaloid obtained, and the accidental loss of a portion of it, prevented an ultimate analysis. N. Rep. Ph., No. 2, 1876, p. 83.

Taxina.—The poisonous properties of the berries of *Taxus baccatus* appear to be due to an alkaloid, which was first isolated by Lucas. W. Marmé has since isolated it by the following process, which, he states, is more suitable and simple than that pursued by Lucas. The material—powdered leaves or seeds—is repeatedly extracted with ether; the ether is distilled off, and the residue is shaken with acidulated water several times, and the aqueous solution filtered through a double filter. Upon addition of ammonia or a fixed alkali to the colorless filtrate, a snow-white, voluminous, flocculent precipitate of taxina is obtained, which, when dried, forms a white, crystalline powder. This is sparingly soluble in distilled water, tolerably readily in acidulated water, and very readily in alcohol, ether, chloroform, benzol, and bisulphide of carbon; insoluble in petroleum ether; odorless, very bitter to the taste. It is colored red by concentrated sulphuric acid; phosphoric, nitric, or hydrochloric acid dissolves it without change of color. It responds to most of the reactions characteristic for alkaloids. Its toxicological action is identical with that of the various extracts of the leaves, in which it is also contained in larger quantity than in the seeds. Ph. Centr. Halle, No. 19, 1876, p. 163.

Oleandria.—This alkaloid, which was described in 1861 by Lukowski, has been prepared by C. Bitteli by the method given by the former, and was found to possess the following characters: A light yellow, scarcely crystalline substance, soluble in water, alcohol, ether, chloroform, amylic alcohol, and olive oil; softens at 56° C. (= 132.8° F.), forms a greenish oil at 70°–75° C. (= 158°–167° F.), and becomes browned above 170° C. (= 338° F.). At 240° C. (= 464° F.) it loses its solubility in water, and its poisonous characters, although its solution in alcohol still retains the characters of an alkaloid. The hydrochlorate is crystalline. Its physiological and chemical relations correspond in the main with those given by Lukowski, but the author has extended them by numerous color reactions and other experiments. The

Pseudocuraria of Lukowski is believed by the author to be a mixture of various normal constituents of the plant, containing, perhaps, a little oleandria. Ch. C. Bl., No. 45, 1875, p. 708.

Anilina.—A. Rosenstiehl reports on the difficulties experienced in the preparation of pure anilina, which, whether prepared from anthranilic acid or benzol, always retains a portion of pseudo-toluidina. The presence of the latter was determined by means of a new test, which is so delicate that a portion of anilina, previously regarded as pure, and which had been subsequently recrystallized several times as oxalate, and finally precipitated in ether, in which the oxalate of pseudo-toluidina is soluble, still gave the reaction of pseudo-anilina. The test consists in mixing 10 c.c. of a solution of anilina in aqueous potassa solution with 10 c.c. of a solution of hypochlorite of sodium. The mixture is then shaken with 10 c.c. of ether, the ether is decanted and washed with water, the washings are returned to the aqueous portion, which is again shaken with ether, and the ethereal liquid added to the first portion. Finally, the ethereal solution is agitated with a little acidulated water, and the mixture allowed to stand. After a few hours the characteristic violet-red color of the pseudo-toluidina will have formed. By the long-continued chemical action of the air (the latter being passed warm through the anilina) the pseudo-toluidina may be nearly, but not entirely, removed from the anilina. Such anilina gives but a very faint reaction with the above-named tests. Ch. Centr. Bl., No. 15, 1876, p. 228; from Compt. Rend., 82, p. 380.

Distinguishing Test from Naphthylamina.—S. Lupton finds that when anilina is boiled with a dilute solution of chloric acid, the color changes through mauve, magenta, and vermilion, to a clear reddish-yellow liquid. Naphthylamina, under the same conditions, passes through blue-black to light yellow. When anilina is boiled with excess of ferricyanide of potassium, the yellow solution changes to a deep chrome-green. After longer treating a blue-black precipitate falls, apparently similar to that obtained by Letheby, by the electrolysis of salts of anilina. Naphthylamina, under the same circumstances, forms a yellow-green solution, with separation of a red resin. When anilina is heated with a 1 per cent. solution of osmic acid a thick, black, flocculent precipitate falls. Naphthylamina, under the same circumstances, forms first a purple solution, and after long treating a brown precipitate. Ch. N., March 3d, 1876, p. 90.

Action of Salts of Vanadium.—Ant. Guyard observed that when about 1 centigram of chloride of vanadium, or of vanadate of ammonium, is added to a mixture of 8 grams of chloride of anilina, 3.5 to 4 grams of chlorate of potassium, and 100 grams of water, the liquid becomes dark in a few moments, and a copious precipitate of

Anilin-black is rapidly formed, and after about forty-eight hours very nearly the theoretical quantity of anilin black has deposited. The reaction is so sensitive that 1 part of the vanadium salt will convert 1000 parts of chloride of anilina into anilin-black (it resembles, in fact, more the process of combustion than that of an ordinary chemical reaction), and it is dependent on the readiness with which the lower oxygen compounds of vanadium are converted into the higher, and, reciprocally, the higher into the lower oxygen compounds. Ph. Centralhalle, No. 17, p. 137.

GLUCOSIDES, ETC.

Salicin.—Maclagan, and since then and independently, Senator, have instituted physiological experiments, by which they arrive at the conclusion that salicin may substitute salicylic acid in the treatment of many diseases for which salicylic acid has been recommended and successfully applied. The former has given it in doses of 0.6 to 2.0 grams, in the treatment of rheumatic affections with success. The latter does not report favorably on its use in this connection, but has obtained very favorable results in various febrile complaints, such as typhus, phthisis, parametritis. Both experimenters draw attention to the absence of the unpleasant secondary effects, which are often observed after the administration of salicylic acid. Ph. Centralhalle, No. 23, 1876, p. 196.

Phloridzin.—The splitting up of phloridzin into *phloretin* and sugar by the aid of acids occurs with the assimilation of 1 molecule of water. Jul. Löwe has observed that the same conversion will occur if phloridzin is simply heated in sealed tubes to 108°–110° C. (= 226.4° to 230° F.), a reaction which is readily conformable to that resulting by the aid of acids. But the author has also observed that when the solid glucoside, which has been completely dried over sulphuric acid, is heated for some time at a temperature of 130° C. (= 266° F.), it is also split into glucose and into a substance which is very closely related to phloretin. Since there cannot be any assimilation of water in this instance, the formula usually given for phloridzin ($C_{21}H_{24}O_{10}$) ($O = 16$) cannot be correct, and analyses made lead to results which may be expressed by the formula $C_{23}H_{30}O_{14}$ ($O = 16$). If this formula is correct, the decomposition of phloridzin is readily explained for the three processes named, and 2 molecules of water are removed during these processes instead of 1 molecule being taken up:

$$\underset{\text{Phloridzin.}}{C_{23}H_{30}O_{14}} - \underset{\text{Water.}}{2\,(H_2O)} = \underset{\text{Phloretin.}}{C_{17}H_{14}O_6} + \underset{\text{Sugar.}}{C_6H_{12}O_6}\ (O = 16).$$

Ch. Centr. Bl., No. 8, 1876, p. 116.

Quercitrin, which hitherto has been classed among the glucosides, under the assumption that by the action of acids it was split into glucose and *quercetin*, is found by Löwe not to be a glucoside. The variable quantities of sugar which have been given as resulting from its decomposition (27–44 per cent.), and, more especially, the fact that by dry distillation quercitrin is converted into quercetin, had caused the author to doubt that it is a glucoside. The reactions with alkaline solutions of copper cannot be regarded as conclusive evidence of the presence of glucose in the product of decomposition, unless glucose can actually be isolated, since many other organic substances have the property of reducing alkaline solutions of copper in common with glucose. The formula for quercitrin has hitherto been conformed to the proportion of glucose it was supposed to yield, and hence there are as many formulas as there have been investigations. The author has prepared pure quercitrin, and from that its lead compound, and quercetin, by processes described in his paper, and has found these upon analysis to have the following formulas (O = 16):

Quercitrin (dried over sulphuric acid) = $C_{15}H_{16}O_9$.
" (melted at 130° C.) (= 266° F.) = $C_{15}H_{14}O_8$.
Yellow lead compound of quercitrin = $C_{15}H_{14}O_8$, PbO.
Orange-red " " = $C_{15}H_{12}O_7$, 2PbO.
Quercitrin = $C_{15}H_{12}O_7$.

Zeitschr. Anal. Ch., Nos. 3 and 4, 1875, p. 233.

Asparagin.—Mercadante concludes that asparagin formed during the germination of seeds is decomposed, ammonia being especially found among the products of decomposition. He does not admit that asparagin is transformed into albumenoids under the influence of light, and of carbonic acid. Light, instead of converting it into albumenoids, decomposes it, forming aspartic and succinic acids. Ch. N., August 5th, 1875, p. 62; from Gaz. Chim. Italiana, No. 4, 1875.

Glycyrrhizin.—Compound with Ammonia.—The experiments of Roussin seem to prove that glycyrrhizin when perfectly pure is nearly tasteless. This is owing to its insolubility, the little taste which it possesses being due to the formation of an alkaline compound with the alkali naturally contained in the saliva, such alkaline compound being soluble. Glycyrrhizin is a well-defined acid, intermediate in its characters between tannic and pectic acids, which exists naturally in the licorice in the form of an ammonium compound. This

Glycyrrhizate of Ammonium, or, as the author prefers to call it, *ammoniacal glycyrrhizin*, is obtained pure by selecting licorice-roots which have a homogeneous yellow fracture, scraping off the cortical portions, bruising it well, extracting it by maceration in cold distilled water, allowing the starchy matter to subside, boiling and filtering the supernatant liquor to remove albumen, and adding to the cooled filtrate sulphuric acid as long as a precipitate is produced. This precipitate composes all the glycyrrhizin contained in the solution; it is washed thoroughly with water to remove acid, is dissolved in three times its weight of 90 per cent. alcohol, the syrupy liquid is mixed with an equal volume of 96 to 98 per cent. alcohol, and a little pectic acid is then precipitated, and is separated by filtration. Ether is then added as long as a precipitate is produced, the mixture is allowed to stand 24 to 48 hours, and the clear liquid is then decanted from the black pitchy substance adhering to the bottom and sides of the vessel. From this clear liquid the glycyrrhizin is precipitated as an ammonium compound by the gradual addition of solution of ammonia in 90 per cent. alcohol, as long as a flocculent precipitate is formed; the precipitate is washed on a fine cloth with a mixture of equal parts of alcohol and ether, is pressed, and dried in a current of warm air. So obtained glycyrrhizate of ammonium is of a yellowish tint, is rapidly and entirely soluble in water, communicates to it an amber color, and an extremely sweet taste, is permanent in the air, and is considered by the author to represent the true sweet principle of licorice-root. For its industrial production it is not necessary to resort to alcohol or ether, the precipitate obtained by sulphuric acid, as above, being well washed, dissolved in ammonia-water, and evaporated to dryness, leaving a friable varnish-like residue of ammoniacal glycyrrhizin. Glycyrrhizin is capable of forming a basic compound which contains double the amonnt of ammonia, and forms deep yellow instead of amber-colored solutions. Upon evaporating its solution to dryness the ordinary compound is formed.

The author refers to the changes which are observed in preparing extract of licorice, and when licorice-root is kept in a damp place, etc., all of which may be explained by the saturation of the ammonia, naturally in combination with the glycyrrhizin, by the formation of an acid (acetic) during fermentive change. That licorice-root contains ammonia becomes evident when the bruised root is treated with soda or potassa, by which a rather strong ammoniacal odor is developed. Attention is also drawn to the power which the glycyrrhizate of ammonium has to disguise the taste of nauseous medicines, such being partly dependent upon the formation of insoluble compounds (with the alkaloids, metallic salts, etc.), and partly to the persistent sweet taste of the ammoniacal compound, which renders the palate for some moments insensible or indifferent to other sensations. Ph. Jour. Trans., July 17th, 1875, p. 53.

Glycyrrhizate of Ammonium.—William Arthur has prepared this compound in thin, amber-colored scales, readily soluble, and remarkably sweet, by the following process: Place 16 oz. of licorice-root in a jar with a close-fitting cover, pour upon it 6 pints of water, and 1 fluid ounce of water of ammonia, and macerate for 48 hours. Drain off the liquid, wash with the residue with 2 pints of water, mix with the first liquid, allow to settle clear, decant, heat to the boiling-point, and filter. Add slowly to the filtrate 3 ozs. of sulphuric acid, allow the mixture to stand 48 hours, collect the precipitated glycyrrhizin, wash it thoroughly, dissolve it in just sufficient water of ammonia diluted with an equal volume of water, and pour the syrupy glycyrrhizate of ammonium upon glass plates to dry. The compound is suggested by the author as a substitute for extract of licorice in the officinal *mistura glycyrrhizæ composita*, which see. Dr. Cir., January, 1876, p. 23.

Gentisin.—H. Hlasiwetz and J. Habermann in pursuance of their researches upon gentisin ($C_{14}H_{10}O_5$) ($O = 16$) have obtained by the action of fused hydrate of potassa upon it an acid, *gentisic acid.* The product of the reaction, neutralized with sulphuric acid and exhausted with ether, gave a syrupy crystalline mass, which was distilled with water to separate acetic acid, neutralized with carbonate of barium, and again shaken with ether. By the addition of sulphuric acid to the residual solution of the barium compound, sulphate of barium is precipitated, this is filtered off, and the gentisic acid extracted with ether.

Gentisic acid crystallizes in long, colorless needles, or prismatic crystals, is rather soluble in cold water, very easily in hot water or in alcohol, is deliquescent in ether, but insoluble in benzin. It gives a deep blue color with ferric chloride, and the color is changed to dirty red by the addition of an alkali. Its composition is $C_7H_6O_4$ ($O = 16$), it melts at 192° C. (=377.6° F.), and at a higher temperature is decomposed, yielding an oily distillate, which soon solidifies on cooling to a crystalline mass, which, by redistillation, may be obtained colorless, and is

Pyro-gentisic acid, of composition $C_6H_6O_2$ ($O = 16$). This melts at 169° C. (=334.4° F.), sublimes readily, forming crystals which resemble benzoic acid, is readily dissolved by alcohol, ether, or hot water, reduces Fehling's copper solution in the cold, and nitrate of silver when heated. Ph. J. Trans., July 31st, 1875, p. 90; Lieb. Am. Ch., clxxv, 62–75.

Hesperidin.—A. Hilger, after reviewing the history and literature on hesperidin, gives the results of his experiments. He finds the dried immature bitter orange of commerce (poma aurantii immatura) yielding 5 to 8 per cent., the best material for its preparation, and recommends the following method: The coarsely powdered material is first exhausted with cold water, and then treated with a mixture of equal parts of water and alcohol, containing about 1 per cent. caustic potassa. Upon the addition of hydrochloric acid impure hesperidin separates from the liquid so obtained. The further purification requires some care, and consists in dissolving the crude hesperidin in a 5 per cent. solution of potassa, adding to this a large excess of alcohol, whereby impurities in the form of brown resinous matter is separated, and the supernatant solution becomes lighter in color; upon the addition of hydrochloric acid nearly pure hesperidin separates, but to obtain it perfectly pure it is necessary to boil it repeatedly with water acidulated with acetic acid.

Hesperidin crystallizes from watery, alcoholic, or acidulated aqueous solutions in the form of white microscopic needles; from alkaline aqueous solution in spheroidal crystals; from alkaline alcoholic solution, after supersaturation with acids, aggregations of needles and spheroidal crystals. It requires 5000 parts of hot water for solution, and is nearly insoluble in cold water; is more readily soluble in alcohol, and especially in hot acetic acid, but not in ether, benzol, and the fixed or volatile oils. Besides the more generally known reactions, the following reactions are specially mentioned by the author: If hesperidin is evaporated to dryness with a little solution of potassa, is then supersaturated with sulphuric acid, and heated carefully, a characteristic color reaction, passing from red to violet, occurs. If 0.1–0.2 gram of hesperidin is heated with ten times its weight of concentrated solution of potassa in a capsule, until the mass begins to melt and decolorization occurs, and if the alkali is then neutralized, and dilute solution of ferric chloride added, a green color is produced, or, if soda solution is added, the color passes from green to blue, violet, and finally red. This color reaction is due to the formation of protocatechuic acid, a reaction which, however, is produced by all glucosides, which as final product of the action of caustic potassa produce protocatechuic acid. The author sums up the results of his experiments as follows:

1. The hesperidin of Brandes, Lebreton, Jonas, and Pfeffer are identical.

2. De Vrij's hesperidin must either be regarded as a mixture, or as a third glucoside. Dehn's hesperidin has no connection with hesperidin proper.

3. Hesperidin is a glucoside, the molecular composition of which may be expressed by the formula $C_{18}H_{21}O_9$ ($O = 16$).

4. By the action of diluted acids it is split into glucose and a

crystallizable product having the molecular formula $C_{12}H_{11}O_4$ (O = 16).

5. Hesperidin, as well as the product of its decomposition, are rapidly decomposed by the action of hydrate of potassa: among the products of this decomposition a volatile alcohol-like body and a well-characterized acid have been determined. The final product of their decomposition by alkalies is protocatechuic acid. N. Rep. Ph., No. 3, 1876, p. 129.

E. Paternò and G. Briosi extract the cut and bruised fruit (*Citrus aurantium*, *Risso*, *C. limonum*, *C. medica*) with alcohol diluted with 3 parts of water, precipitate the hesperidin, as in the above method of Hilger, by hydrochloric acid, but find acetic acid to be the best solvent for its purification, the glucoside being dissolved in that liquid, the solution filtered, and allowed to stand a day or two, when it crystallizes pure. The melting-point of these crystals varies between 243° and 245° C. (= 469.4° and 473° F.). Jour. Ch. Soc., May, 1876, p. 709; from Deut. Ch. Ges. Bar., IX.

Dulcamarin.—E. Geissler has made some very thorough and comprehensive experiments upon the bitter principle of Solanum Dulcamara, by which he proves it to be a glucoside, and devoid of nitrogen. By Wittstein's method he failed to obtain a perfectly pure product, as was also the case with numerous other methods employed. He finally obtained it in a pure condition by digesting the aqueous extraction of the bittersweet stalks with well-washed and freshly charred granular animal charcoal,* until the bittersweet taste of the liquid was completely removed, then washing the charcoal with hot distilled water until this passed colorless, drying the charcoal, and exhausting it by percolation with alcohol. The alcoholic solution yielded upon evaporation a dark mass, which, when melted together, constituted a yellowish-brown, brittle resin, which readily formed a grayish-yellow powder. This still contained nitrogen, in proportions, however, which varied under different conditions, and the author, therefore, concluded that its presence was due to impurity, the removal of which he finally accomplished by the addition of ammonia to the aqueous solution, filtering the

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[*] The author prefers, with Kromayer, animal charcoal which has been purified by repeated boiling with water, and then freshly charred. Kromayer had found that the purification by Lebourdai's method, with hydrochloric acid, was objectionable for this purpose, since the last portions of chloride of calcium were very difficult to remove, and might be subsequently introduced into the product, especially if this is uncrystallizable.

clear solution from the precipitate formed, precipitating the bitter principle by subacetate of lead, digesting the washed precipitate with alcohol, and decomposing it with sulphydric acid. The alcoholic solution yielded pure dulcamarin, contaminated only with a small quantity of sulphide of lead, from which it was freed by re-solution in alcohol, filtration, and evaporation. The product was found to have a composition corresponding to the formula $C_{22}H_{34}O_{10}$ ($O = 16$), and proved to be such by the analysis of its compound with lead.

Dulcamarin forms a faint yellow, perfectly odorless powder, which is permanent in air, has at first a strongly bitter taste, which subsequently becomes persistently sweet, as is the case with the bittersweet itself. It melts readily by heat, is soluble in 5 parts of hot and in 8.5 parts of cold alcohol, in 30 parts of cold and in 25 parts of hot water, forming yellow to red-brown solutions according to their concentration, and is left upon evaporation in form of a pure yellow, resin-like, transparent mass. It is insoluble in ether, chloroform, benzol, bisulphide of carbon, and petroleum ether, but is readily dissolved in acetic ether. Acetic acid dissolves it readily, forming a wine-yellow solution. Sulphuric acid dissolves it with a yellowish-red color, which gradually becomes pure red, cherry-red, and, after several hours, again paler. Upon the addition of sugar to its solution in sulphuric acid, a yellow color is produced, which gradually becomes handsome cherry-red on the edges, and, after several hours, black-brown. Concentrated hydrochloric acid forms a faint yellow solution, which gradually becomes colorless, while concentrated nitric acid differs only in a somewhat intenser color. Solution of molybdic acid in sulphuric acid (Fröhde's reagent) colors dulcamarin yellowish-brown, and this changes on the edges to violet. It is dissolved by caustic alkalies and by baryta-water with a dark red-brown color, and precipitated from such solution by acids; is precipitated from its aqueous solutions by tannic acid, but not, as is Wittstein's dulcamarin, by bichloride of platinum, nor by ammoniacal solution of silver, or chloride of gold. Acetate of lead produces faint turbidity in aqueous or alcoholic solution, while subacetate produces a voluminous precipitate. By the action of dilute mineral acids it is split into

Dulcamaretin and glucose, the reaction occurring according to the following equation:

$$\underset{\text{Dulcamarin.}}{C_{22}H_{34}O_{10}} + 2H_2O = \underset{\text{Dulcamaretin.}}{C_{16}H_{26}O_6} + \underset{\text{Glucose.}}{C_6H_{12}O_6}.$$

Neither emulsin or yeast are capable of producing this reaction. Dulcamaretin was obtained in the form of a black-brown, glistening, friable, resinous substance, which is insoluble in water, ether, chloroform, bisulphide of carbon, and amylic alcohol, but soluble in 18 parts of cold and 9 parts of warm 90 per cent. alcohol, forming red-brown to black-brown solutions.

The quantity of dulcamarin obtained by the author from bittersweet stalk was 0.38 to 0.40 per cent., and this yielded 62 to 64 per cent. of dulcamaretin, and 36 to 38 per cent. of glucose. Arch. Pharm., Oct. 1875, p. 289.

Cotoin.—Julius Jobst has determined coto bark (which see) to contain, in addition to the proximate constituents found by Wittstein, a crystallizable substance which, analyzed by J. A. Tod, proved to have a composition corresponding to the formula $C_{21}H_{20}O_6$ $(O = 16)$. It is prepared by exhausting the coto bark with ether by displacement, distilling off $\frac{9}{10}$ths of the ether, adding to the residual ethereal solution 6 parts of petroleum ether, allowing the remainder of the ethylic ether to be evaporated, and then decanting the clear solution from an abundance of resin which has separated, and allowing the cotoin to crystallize spontaneously. A portion of resin separates during the deposition of the crystals, but, adhering to the sides of the vessel, the crystals are readily removed by stirring, and may be poured out with the mother-liquor. The crystals are then purified by expression and several crystallizations from hot aqueous solution. So obtained cotoin forms yellowish-white, light, prismatic crystals, resembling commercial gallic acid, possesses the sharp taste of the bark in a high degree, is sparingly soluble in cold, more readily soluble in hot water, readily soluble in alcohol, ether, chloroform, and in bisulphide of carbon. From its alcoholic solution it is readily obtainable in large sulphur-yellow prisms. Benzin and petroleum ether dissolve it with more difficulty. It melts at about 124° C. (= 255.2° F.). Alkalies dissolve it, forming yellow solutions, from which acids again precipitate it. It is dissolved by concentrated nitric acid with a blood-red, by concentrated sulphuric acid with a brown-yellow, and by hydrochloric acid with a pure yellow color. Its aqueous solutions are neutral, and it reduces Fehling's solution slowly in the cold, rapidly by the aid of heat. N. Rep. Ph., No. 1, 1876, p. 23.

Santonin and Santonic Acid.—By the reaction of chloride of acetyl upon santonic acid Fausto Sestini has obtained monoacetylsantonic acid ($C_{15}H_{19}(C_2H_3)O_4$). The ether which has been employed to wash the latter deposits, on evaporation, a white substance possessing an acid reaction and melting at 126°–128° C. (=258.8°–262.4° F.). Ch. N., July 9th, 1875, p. 19; from Gaz. Chim. Italiana, 1875, No. 3.

Albuminated Santonate of Sodium.—According to "Gazzetta de Medic. di Napoli," a preparation under the above name has recently been much recommended as an anthelmintic. It is prepared by gently heating in a porcelain dish a mixture of 4 parts of bicarbonate of sodium, 1 part of santonin, and 2 parts of dried soluble egg or blood albumen, with a small quantity of water, until a solution is effected; this is evaporated to dryness, and subsequently redissolved in a sufficient quantity of warm water, the solution filtered, and again evaporated to dryness. The resulting albuminated compound forms colorless shining scales, which are soluble in water, alkaline, and contain carbonic acid from excess of bicarbonate used. Dr. Cir., February, 1876, p. 39.

Cantharidin.—Beguin found that when Spanish flies are extracted with chloroform the solution contains all the cantharidin, as these so exhausted flies yield no additional cantharidin to acetic ether. He concludes from this circumstance that the cantharidin exists in the flies in the free state, and not as a cantharidate, as is by some assumed. He, however, prefers acetic ether to the chloroform for the extraction of the cantharidin. Zeitschr. Œst. Ap. Ver., No. 23, 1875, p. 374.

Aloin.—W. A. Tilden has continued his researches upon the aloins obtained from several varieties of aloes designated as follows:

Barbaloin.—From Barbadoes aloes. Discovered by Smith & Co., of Edinburgh, and analyzed by Stenhouse.

Socaloin.—Isolated from Socotrine aloes in 1856 by T. B. Groves.

Nataloin.—Discovered by Flückiger, 1871.

Zanaloin.—Prepared by Histed from a variety of Socotrine aloes imported from Zanzibar. Analyzed by Flückiger, 1871.

By their ultimate analyses, as well as that of their bromo- and chloro-derivatives, he arrives at the conclusion that *barbaloin* and *zanaloin* are isomeric when in the anhydrous state, and this conclusion is supported by all that we know of their botanical origin and physical characteristics, as well as their chemical properties. Zanaloin and its derivatives contain, however, a large amount of water of crystallization. *Socaloin* is believed, and with great probability, to be identical with zanaloin. *Nataloin* is evidently widely separated from the rest of these crystalline principles by its inferior solubility, and especially by the circumstance that it yields no chrysamic acid nor definite chloro- or bromo-substitution derivatives. His results preclude the adoption of Rochleder's theory, that these bodies constitute three successive terms of a homologous series. Barbaloin and zanaloin must be represented by the same formula, for which, in their anhydrous state, he proposes the symbols $C_{16}H_{18}O_7$. Ph. J. Trans., September 11th, 1875; from Proceedings Br. Ph. Conf.

Aloin, from Barbadoes Aloes, has been prepared by E. Schmidt by the process recommended by Tilden, which consists in extracting the aloes with water acidulated with sulphuric acid, allowing the resin to subside, concentrating the clear liquid to twice the weight of the aloes used, and allowing to crystallize. The crystals are recrystallized from dilute alcohol, and then obtained pure and abundantly. He subjected the product to ultimate analysis, which leads him to accept the formula given it by Tilden ($C_{16}H_{18}O_7$ ($O = 16$)), although he had obtained slightly different results in regard to the bromine and chlorine derivates of his aloin. The author describes these, as also their reactions with nitric acid and with powdered zinc. Arch. Pharm., June, 1876, p. 496.

C. L. Mitchell, who has experimented with a view to determining a reliable process for the preparation of aloin, recommends that of Tilden (see A. J. Ph., 1871, p. 34, and Proceedings, 1873 (barbaloin), p. 390). The aloin obtained by that process is rather impure, but may be obtained pure by redissolving it in warm water, treating with animal charcoal, and again evaporating and crystallizing. One pound of good Barbadoes aloes will yield about 600 grains of aloin, which is of a yellow color, crystalline, extremely bitter and aloetic to the taste, slightly soluble in cold water, soluble in alcohol, very soluble in hot water, and active in two-grain doses.

Aloin (nataloin), prepared from Natal aloes by the same process, was found to be very weak in its action, 15 to 20 grains having but slight purgative effect. It seems, therefore, important that some distinguishing test should be generally known, and this the author finds in the test proposed by Histed. A few grains of aloin are added to several drops of strong sulphuric acid, and a glass rod, moistened with strong nitric acid, is gently passed just over its surface. If nataloin, a blue color immediately results. Barbaloin is detected by giving a red color with strong nitric acid. A. J. Ph., January, 1876, p. 24.

Picrotoxin.—Richard Apjohn has prepared picrotoxin from cocculus indicus, with a view to studying its characters, and finds that the determination of its melting-point furnishes an easy and certain criterion of its identity. He finds that the crystals deposited from aqueous solution contain no water of crystallization, for, having heated them to a temperature slightly below their fusing-point, they had lost no weight. Their melting-point is at 192° C. (= 377.6° F.), and is determined by introducing about half a milligram into a capillary tube sealed at one end, attaching the tube to a thermometer by means of a few turns of platinum wire, and then heating gradually in a beaker containing oil of vitriol.

Vanillic Acid.—F. Tiemann has endeavored to convert vanillin (vanillic-aldehyd) by direct oxidation into vanillic acid, and, failing in this, succeeded to prepare it direct from coniferin (see Report, 1875, p. 449). 1 part of coniferin is heated with 30–40 parts of water and a solution of 2–3 parts of permanganate of potassium in 60–90 parts of water is then added. An immediate and voluminous precipitate of peroxide of manganese is formed, which is strained off, the clear, nearly colorless solution is concentrated to one-fifth its volume, and treated with sulphuric acid to decided acid reaction. It is then kept at a temperature of 60°–70° C. (= 140°–158° F.) for twenty to thirty minutes, allowed to cool, and shaken with ether, which yields vanillic acid—corresponding to the formula $C_8H_8O_4$ ($O = 16$)—upon evaporation. Vanillic acid forms colorless crystalline leaflets or needles, according to the solvent from which it is crystallized. It is readily dissolved by alcohol; somewhat less so in ether, and sparingly in cold water, has a faint vanilla odor, melts at 211°–212° C. (= 231.8°–233.6° F.), and sublimes unchanged. Various salts were prepared by the author, and he defines it in its chemical relations to be *monomethylprotocatechuic* acid.

Subsequently the author, aided by C. Reimer, endeavored the synthetical production of vanillic acid. Operating upon protocatechuic acid they obtained a monomethylprotocatechuic acid, which nevertheless was distinct from vanillic acid. By acting upon dimethylprotocatechuic acid with dilute hydrochloric acid, they obtained two acids, one of which was identical with the acid obtained from protocatechuic acid, while the other was doubtless vanillic acid.

Referring in a subsequent communication to the production of vanillic acid from coniferin, the authors state that the primary action of the permanganate of potassium upon coniferin consists in converting it into a new glucoside, which they name

Saccharo-vanillic Acid.—This, upon the prescribed heating for twenty to thirty minutes with sulphuric acid in excess, is split into sugar and vanillic acid. The new glucoside may be obtained by concentrating the solution of oxidized coniferin, before the addition of acid, to a small volume, and then cooling rapidly, when it will separate in form of a crystalline magma.

The authors propose to continue their researches in this direction, and propose to include other glucosides, which they believe to give similar results when oxidized by permanganate of potassium. Ch. C. Bl., No. 25, 1875, pp. 391–392.

Vanillin and Vanillic Acid may, according to Ferd. Tiemann, be also obtained from *eugenol.* When this substance is heated with acetic anhydrid, aceteugenol is formed, which is an oily body, boiling at 270° C. (= 518° F.), and crystallizing at low temperatures in pearly laminæ. Aceteugenol yields by oxidization in slightly acid solutions a large quantity of acetovanillic acid, together with a smaller quantity of acetovanillin; and these bodies, when heated with potassa, yield respectively vanillic acid and vanillin. Journ. Chem. Soc., May, 1876, p. 711; from Deut. Ch. Ges. Ber.

In his paper on the constitution of eugenol (which see) Wassermann states, that by oxidizing ethyleugenol he had observed a brown crystalline substance having the odor of vanilla, but that the quantity was too small to permit of a careful examination.

Vanillin.—According to a recent communication, read before the Berlin Chemical Society by Ferdinand Tiemann, vanillin must be added to the list of substances that can be prepared by synthesis. The stages of the process are as follows: By the reaction between carbolate of sodium and carbonic acid, paraoxybenzoic acid is produced;* from paraoxybenzoic acid protocatechuic acid can be prepared, and from protocatechuic acid may be obtained dimethylprotocatechuic acid. When the latter is heated with dilute hydrochloric acid in a sealed tube to 130° or 140° C. (= 266°

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* Under the article salicylic acid, on page 375, Proceedings, 1875, attention is drawn to the remarkable fact that when carbolate of potassium is substituted for the sodium compound, paraoxybenzoic acid is formed instead of salicylic acid.

or 284° F.), among the products of decomposition is found monomethylprotocatechuic or vanillic acid, of which vanillin is the corresponding aldehyd. The retrograde conversion of the acid into the aldehyd has been effected and perfectly pure crystals of vanillin have been obtained. The other products of the decomposition of vanillic acid were carbonic acid and guaiacol, the latter corresponding in every respect with that obtained from beechwood tar. Ph. J. Trans., February 26th, 1876, p. 688.

Tiemann has found that by the action of acetic anhydrid upon the sodium salt of vanillin a coumarin-like body is produced, which has been named vanillin-coumarin. This body when boiled with caustic potassa is converted into an acid identical with the *ferulic* acid of asafœtida, and a link is thus established between vanilla and asafœtida. Ph. J. Trans., April 8th, 1876, p. 813.

Hager believes that artificial vanillin is calculated to take the place of vanilla completely, and suggests the preparation of a powder, composed of 1.0 vanillin and 100.0 of sugar, for flavoring purposes. 0.2–0.3 grams of this powder will flavor a cup of tea, 0.5 gram will render 150.0–200.0 grams of a badly tasting mixture palatable. He believes, furthermore, that vanillin will substitute musk as a stimulant, and invites experiments in this direction. Ph. Centr. Halle., No. 9, 1876, p. 76.

COLORING MATTERS.

A comparative examination of various natural and artificial coloring matters to determine their relative coloring power, has been made by Th. Küpfer. The several colors were macerated in diluted alcohol and filtered.

I Series: yellow, orange-yellow, orange-red.

Natural coloring matters.	Corresponding strength of color.
Safflower,	1 : 150
Turmeric,	1 : 200
Gamboge,	1 : 200
Annotta,	1 : 250
Saffron,	1 : 700

Artificial coloring matters.	Corresponding strength of color.
Picric Acid,	1 : 1000
Martius-yellow (Naphthalin derivative),	1 : 2000
Hexanitrophenylamin,	1 : 14000
Alizarin (from Anthracen),	1 : 18000

II Series: red and purple.

Natural coloring matters.	Corresponding strength of color.
Sandel,	1 : 100
Cochineal,	1 : 350
Campeachy Wood,	1 : 550

Artificial coloring matters.	Corresponding strength of color.
Purpurin (Anthracen derivative),	1 : 1000
Corallin (Phenol coloring matter),	1 : 2500
Safranin (Toluidin derivative),	1 : 2500
Naphthalinrosa,	1 : 4000
Fuchsin (Rosanilin),	1 : 6500

Schweiz. Wochenschr. f. Ph., No. 24, 1876, p. 191.

Indol.—Preparation from Albumen.—Nencki has succeeded in preparing this interesting body much more readily and at a less cost than is possible from indigo, by the following method: 300 grams commercial blood albumen are dissolved in 4½ litres of spring-water, contained in a thin beaker of 5 litres capacity; 300 to 400 grams of beef-pancreas, cut fine, and completely deprived of bloody and fatty particles, are added, and the whole is kept for 60 to 70 hours exposed in a water-bath at a temperature of 40° to 45° C. (= 104° to 113° F.). The mixture is then allowed to cool, strained through linen, acidified with acetic acid, and distilled upon a sand-bath until about three-fourths has passed over. The distillate is filtered, hydrate of lime is added to faint alkalinity, and it is shaken with an equal volume of ether. The clear ethereal solution is decanted, and on evaporation yields a reddish oil, which has the characteristic odor of indol, and deposits this in a pure and crystalline state on the addition of a little water. The yield is about 0.3 per cent. of the albumen. Zeitschr. Anal. Ch., Nos. 3 and 4, 1875, p. 406.

Litmus.—Preparation of the Pure Coloring Matter.—Commercial litmus usually contains indigo, and is naturally associated with green-fluorescent coloring matter and purple, orceïn-like matter, all of which interfere with the sensitiveness of litmus solution. The indigo and green-fluorescent substances are removed, according to V. Wartha, by agitating the litmus, in lumps, with ordinary alcohol and boiling. The turbid solution is decanted, and will deposit the indigo, while the green-fluorescent matter remains in solution. The residual lumps of litmus are then macerated in distilled water for 24 hours, the clear litmus solution is decanted, evaporated to the consistence of extract, the extract is repeatedly washed with absolute alcohol containing acetic acid, and the residue is then completely dried and powdered. The powder is now completely extracted with absolute alcohol containing acetic acid; by which the orceïn-like red coloring matter—which is changed to purple instead of blue by ammonia—is removed. The residue is now dissolved in water, evaporated to dryness, moistened repeatedly with alcohol, and dried, in order to remove acetic acid remaining in it. The product is the purified litmus coloring, which dissolves in water with reddish-brown color, and is extremely sensitive. Ph. Centralhalle, No. 17, 1876, p. 140; from Ber. Chem. Ges.

Alizarin.—Formation from Rufigallic Acid.—O. Widman has observed that when rufigallic acid is treated with water and sodium amalgam, a violet-colored solution is produced. Upon saturating this solution with hydrochloric acid a precipitate is produced, which is washed, dissolved in solution of potassa, and the solution treated with chloride of barium, which again produces a precipitate. The precipitate is decomposed by hydrochloric acid, the undissolved residue is dissolved in methylic alcohol or acetic acid, the solution evaporated to dryness, and heated to 250° C. (= 482° F.), when an orange-red sublimate of glistening needles is obtained, which has all the reactions, and very nearly the composition of alizarin. Ch. Centr. Bl., No. 8, 1876, p. 116; from Bull. Soc. Chim. Par.

Chrysophyll.—F. A. Harsten has continued his experiments upon this coloring matter, chiefly with the view to determine a cheap method for its preparation. The process formerly given (see Report, 1873, p. 394) is modified in some particulars. The fresh leaves are extracted by alcohol, the tincture is allowed to evaporate spontaneously in a cool place. A sediment of fat and chlorophyll forms, in which the splendid gold-glistening crystals of chrysophyll are imbedded. To remove these the sediment is shaken rapidly with a little petroleum ether, which removes the fat and chlorophyll, while the residue contains the chrysophyll, mixed with a little fat and a gray substance. Upon treatment of the mixture with alcohol, spontaneous evaporation of the filtrate, and several recrystallizations from alcohol, the chrysophyll is obtained pure. It is colored handsome blue by conc. sulphuric acid. Ch. C. Bl., 39, 1875, p. 613.

Phyllocyanin.—Its Uses as a Reagent.—According to Guido Pellagri, phyllocyanin, the blue coloring matter of flowers, is a reagent which may render some service in chemistry, on account of its exquisite sensibility to the least traces of alkali. It is best preserved along with such slight trace of acid as may give it a dull purple color, and is most readily obtained from the iris and the blue violet. It will prove a valuable substitute for litmus in volumetrical operations, as there can be no doubt as to the end of the reaction. The following table shows its sensitiveness as compared with litmus:

Potassa.	Phyllocyanin.	Litmus.
$\frac{1}{400}$	Transient green, then yellow.	Distinct reaction.
$\frac{1}{1000}$	Green rather stable, and then yellow	" "
$\frac{1}{10000}$	Stable green.	" "
$\frac{1}{100000}$	"	" "
$\frac{1}{200000}$	"	Reaction scarcely manifest.
$\frac{1}{400000}$	At first green, then stable blue.	" " "
$\frac{1}{600000}$	Stable blue.	No reaction.
$\frac{1}{1200000}$	"	"

Ch. N., April 13th, 1876; from Gaz. Chim. Italiana, No. 1, 1876.

Xylindëin is the name given to a green coloring matter, which is produced upon decaying beech, oak, and birchwood, by the pathological influence of *Peziza æruginosa.* Prof. C. Liebermann has extracted it from such wood by means of phenol, the dark green solution was precipitated with alcohol or ether, the flocculent precipitate drained upon a porous tile, dissolved in the smallest possible quantity of warm phenol, filtered and allowed to cool. The coloring matter crystallized out gradually in form of small, coppery-glistening, four-sided tables, which are insoluble in most solvents, but are dissolved by sulphuric acid with a grass-green color, and in anilin or phenol with a dark-green color. The author proposes to continue his investigations. Arch. Ph., August, 1875, p. 170; Ber. Ch. Ges., VII, 1102.

Coloring Matter of Wine.—Stierlin recommends as a rapid method to determine the coloring matter of wine that of Fauré, which depends upon the circumstance that the coloring matter of genuine wines is completely precipitated by tannin and gelatin, leaving a colorless liquid, while artificial coloring matters invariably remain in solution. The method does not, of course, determine the nature of the artificial coloring substance. A more accurate method is the following, which is similar to that pursued by Glénard for the preparation of *Oenolin* ($C_{20}H_{10}O_{10}$, the coloring matter of wine): 250 c.c. of wine are precipitated with solution of subacetate of lead, the precipitate is washed and dried at 100° C. (= 212° F.). The dry powder is placed in a tube, which at its lower extremity is drawn to a fine point and loosely stopped with cotton. It is then twice percolated with 25 c.c. of ether, saturated with hydrochloric acid, whereby the lead compound is decomposed and chloride of lead is formed, and the excess of acid is then displaced by portions of 10 c.c. pure ether, until it is completely removed. The coloring matter is then extracted by alcohol, which requires 4 to 5 treatments with 50 c.c. of alcohol. If the wine has not been artificially colored the residue of chloride of lead will appear perfectly white, while the alcoholic solution, when diluted to 250 c.c., will show the original color of the wine, or, at all events, will be very little lighter. Schweiz. Wochenschr., No. 49, 1875, p. 415.

R. Sulzer draws attention to a simple test, by which artificial coloring matters in wine may be distinguished from that naturally belonging to it. It consists in mixing equal parts of the wine and nitric acid (either pure or crude). If the coloring matter is genuine, the mixture will retain its color for at least one hour; while if artificial, such as the coloring matter of mulberries, pokeberries, malva flowers, logwood, carmine, or fuchsin, the color will disappear immediately or within a minute. The test is quite accurate. Schweiz. Wochenschr. f. Pharm., No. 20, 1876, p. 160.

Coloring Matter of Murex Trecuculus.—A. and G. De Negri find that the purple coloring matter of M. trecuculus is composed of two coloring matters, one being indigo, which they have obtained pure. While the juice of M. trecuculus becomes colored even in the dark when exposed to air, that of *M. brandaris* only acquires color when also exposed to light; the coloring matter of the latter must therefore differ from that of the former. Ch. Centr. Bl., No. 15, 1876, p. 230; from Gazz. Chim. Italiana.

ALBUMINOIDS.

Albumen.—Restoration.—Albumen is rendered partially insoluble and useless for printing by a variety of causes, such as long standing, heating above 35° C. (= 95° F.), etc. G. Wagner restores albumen solutions, so that they are again fit for use, by digesting them at a blood-heat with the parings of the stomach of calves and a little hydrochloric acid—30 parts of the first, cut into small squares and well washed with cold water, 10 grams of the acid to 400 grams of albumen. After thirty-six hours he neutralizes with ammonia, and the solution is again fit for use. G. Witz effects the same purpose with the stomach of sheep. He also gives the specific gravity of albumen solutions of various strengths; the solutions being at 17.5° C. (= 63.5° F.), and the albumen assumed to contain 15 per cent. hygroscopic water.

Albumen. Per cent.	Degree of Baumé.	Specific gravity.	Albumen. Per cent.	Degree of Baumé.	Specific gravity.
1	0.37	1.0026	25	8.72	1.0644
2	0.77	1.0054	30	10.42	1.0780
3	1.12	1.0078	35	12.12	1.0919
5	1.85	1.0130	40	13.78	1.1058
10	3.66	1.0261	45	15.48	1.1204
15	5.32	1.0384	50	17.16	1.1352
20	7.06	1.0515	55	18.90	1.1511

Ch. N., March 31st, 1876; from Reimann's Färber-Zeit., Nos. 8 and 9, 1876.

A. Heynsius had in a recent paper recommended for the qualitative determination of albumen in animal fluids, that the liquid be acidulated with acetic acid, solution of common salt added, and heated, whereby the albumen is completely precipitated. Believing that the method might be applied to the quantitative determination of albumen in such liquids, the author has since experimented but finds the process inapplicable, since a portion of the precipitated albumen is redissolved by the washing necessary. He reviews the various methods in use, and finds it best to precipitate the exactly neutralized liquid with alcohol. As saline matter is also thus precipitated, this must be removed by washing the precipitate with water, is then determined in the wash-water, and deducted from the previously ascertained weight of albumen. For some liquids this method is not applicable (*e. g.*, urine), and for these he recommends the process of dialysis. Ph. C. Bl., No. 50, 1875, p. 794; from Med. C. Bl., 13, 839.

The method proposed by Heynsius in 1870 for the detection of albumen in animal fluids, especially in urine, is still regarded by him as the best and safest; although it cannot be employed for the quantitative determination of albumen. After reviewing the various known methods he recommends the following quantitative method: The greater part of the salts and all the other crystalloids are removed by dialysis, by which merely a trace of albumen passes the parchment-paper. The dialyzed liquid is then brought to ten times its original volume, and in 50 c.c. the total solids therein determined. From the figure so obtained 2 per cent. is deducted for alkali, when the remainder shows the amount of albumen. The author's qualitative method consists in acidifying the urine distinctly with acetic acid, adding a few c.c. of a concentrated solution of chloride of sodium, and then boiling. Ch. N., October 8th, 1875, p. 180; from Arch. Néerlandaises des Sciences, No. 1, 1875.

A. Heynsius finds that he can prepare from ether ovalbumin or seralbumin three classes of compounds: (1) compounds with alkaline earths; (2) with alkalies; (3) with acids. The compound with an alkaline earth is soluble in water. On gently warming its solution, a portion of the albumen separates in the uncoagulated form; but at a higher temperature the albumen coagulates. Neutral salts (NaCl) influence the coagulability. Up to a certain point the coagulating temperature is higher the greater the quantity of salt added. Alkali-albuminates and acid-albumens differ according to the methods used in their preparation. The action of acids and alkalies is impeded by neutral salts (NaCl). Heynsius holds that Schmidt and Aronstein's view that albumen is a substance soluble in water, and when deprived of its salts coagulates by heat, is erroneous. He holds the opinion that when a solution of albumen is heated an alkali-albuminate is formed, and that acid-albumen is separated. Jour. Chem. Soc., May, 1876, p. 718; from Pflüger's Archiv f. Physiologie.

Schmidt and Aronstein fully confirmed an observation of Graham, that solutions of albumen may be freed from chloride of sodium by dialysis; and they also noted that such desalted albuminous liquids are not coagulated by boiling, but that their coagulability is restored by the addition of salt. Heynsius attributes the noncoagulability of the above solution to their alkalescence, and asserts that the power of coagulating by heat is restored by acidification. Winogradoff confirms the statement of Heynsius that the coagulability of desalted albumen is restored by acidification, but he finds that the dialyzed albumen still contains a considerable proportion of mineral constituents, and yields an ash containing carbonates, chlorides, and earthy phosphates, although dialysis had been prolonged until the dialyzing water no longer took up soluble chlorides. Ibid., p. 719.

Mercadante has observed that a 7 per cent. aqueous solution of egg albumen is capable of dissolving freshly precipitated phosphate of calcium in such quantities that a litre contains nearly 3 grams of the phosphate, and infers from this that the albuminoids favor the solubility of bone-earth in the living organisms. Ch. C. B., No. 50, 1876, p. 790; Gazz. Chim. Italiana, 5, 311.

Detection in Urine.—Galipe recommends a deep yellow solution of picric acid for the detection of albumen in urine. A test-tube is one-third filled with the solution of picric acid, and a drop or more of urine is added. In the presence of albumen, a distinct whitish turbidity is produced, and when the liquid is warmed the albumen rises on the surface in form of an agglutinated mass. The reaction is sufficiently sensitive, and is not vitiated by the presence of phosphates or urates. Zeitschr. Anal. Ch., Nos. 3 and 4, 1875, p. 417.

Blood.—A. Gautier finds that when chloride of sodium is dissolved in fresh blood to the amount of 4 per cent. it loses its property to coagulate, and may then be filtered so as to produce a colorless liquid. This liquid regains its property of coagulating when it is diluted with sufficient water to reduce the chloride of sodium to 1 per cent., and it may be evaporated in a partial vacuum to powdery dryness. The powder so obtained forms solutions, which when sufficiently diluted have the property to coagulate, and it may be heated to 100° C. (= 212° F.) without becoming insoluble. Ch. C. Bl., No. 34, 1875, p. 534; Bull. Soc. Chim. Par. (N. S.), 23, p. 482.

Soluble Albuminate of Mercury.—Prof. H. v. Bamberger, after repeated experiments to obtain a suitable solution of mercury for hypodermic use, has succeeded to prepare a solution of albuminate of mercury, which is quite stable. The main difficulty exists in the filtration of the solution of albumen. 200 c.c. of egg albumen, deprived as much as possible of membrane, are mixed and shaken with 300 c.c of water, the mixture is strained and filtered, at first through glass wool, and finally through paper. 100 c.c. of this filtrate, which is but very faintly opalescent, are mixed with 60 c.c. of a 5 per cent. solution of corrosive sublimate, and the precipitated albuminate is then redissolved by the addition of 60 c.c. of a 20 per cent. solution of chloride of sodium. When the albuminate is dissolved the measure is made up to 300 c.c. by the addition of 80 c.c. of water, and the preparation finished by filtering through a double filter, after having previously stood at rest for two days. 1 c.c. of the solution contains 0.01 gram of corrosive sublimate. Zeitschr. Œst. Ap. Ver., No. 10, 1876, p. 147.

Dr. E. W. Hamburger draws attention to the extreme difficulty presented by the very slow filtration of the albumen solution, and suggests that this may be obviated by removing the *precipitable* albumen by the addition of acid in excess. Hydrochloric acid being used, this is subsequently neutralized by carbonate of sodium, and the quantity of chloride of sodium so formed is deducted from that necessary to the solution of the albuminate of mercury. Ibid., No. 12, p. 177.

Bamberger does not find it necessary to remove precipitable albumen by means of acid. He finds that greater dilution of the albumen solution will enable its ready filtration, the filtrate becoming absolutely clear. He therefore recommends the addition of 3 to 4 volumes of water to 1 volume of albumen, which furnishes a solution sufficiently strong in albumen for the above purpose. He agrees with Hamburger, however, that neither the albumen nor corrosive sublimate should be in excess, and adopts the suggestion made by the latter to employ carbonate of sodium as a test for determining such excess. The solution of corrosive sublimate is added to the solution of albumen until the first traces of a yellow color appear when testing with carbonate of sodium. Solution of albumen, reserved for this purpose, is then added until a drop no longer evidences an excess of corrosive sublimate on adding carbonate of sodium. The solution should be kept in small vials in a cool place. Ibid., p. 179.

FERMENTS.

Invertin.—E. Donath has obtained from yeast a peculiar substance which possesses the power to convert cane-sugar into invert-sugar. A very small quantity added to a solution of cane-sugar effects complete inversion in from ten to fifteen minutes at the ordinary temperature, and he therefore proposes to name the new substance "invertin." It is obtained by exhausting yeast with absolute alcohol, expressing, and drying the washed yeast at a gentle heat. It is then exhausted with water, the solution is filtered until it is completely freed from yeast-cells. The solution is shaken with ether, which now takes up the invertin in the form of a mass resembling frog-spawn. This, after shaking with water, is dropped into absolute alcohol, from which it separates as a flaky mass, and, when dried under the air-pump, forms a white powder, which swells up in a high degree when immersed in water. Invertin does not affect starch or dextrin solutions. Ph. Centr. H., No. 40, 1875, p. 339.

Pepsin.—It is stated in "Der Zoologische Garten" that the dried inner coating of the stomach of the American ostrich (Rhea Americana) is in Buenos Ayres used, in the form of a coarse powder, to promote digestion, and is for this purpose commonly kept in the drug stores of the larger towns and cities. Ph. Centr. Halle, No. 5, 1865, p. 38.

Pancreatin.—The result of E. Scheffer's experiments on this protein substance proves that when brought into the stomach it is destroyed, and that it can, consequently, have neither physiological nor therapeutic effect when taken internally. Proceedings, 1875.

URINARY AND BILIARY COMPOUNDS.

Determination of Free Oxygen in Urine.—D. Freire recommends pyrogallic acid, 1 gram of which, dissolved in excess of ammonia, absorbs 38 centigrams (= 260 c.c.) oxygen (Doebereiner). The author dissolves 2 milligrams of pyrogallic acid in 50 c.c. urine, adds recently boiled water to form a nearly colorless solution, covers this with a layer of pure oil of turpentine a few millimetres in thickness, pours ammonia down the side of the vessel, by which a faint violet or yellowish color is produced, and then titrates with solution of protochloride of tin of ascertained strength. The latter is ascertained by perfectly oxidizing 2 milligrams of acid in ammoniacal solutions, and determining the quantity of solution of tin required for complete decoloration. Ch. C. Bl., No. 44, 1875, p. 695; Compt. Rend., 81, p. 229.

Uro-chloralic Acid.—Musculus and De Mermé have isolated from urine, collected after the administration of chloral, a peculiar acid, which they regard as a compound of chloral and of an organic component of the urine, and which they have named uro-chloralic acid. It forms crystals, resembling tyrosin in their form, is very soluble in water and in alcohol, sparingly soluble in ether-alcohol, and nearly insoluble in pure ether. It reacts strongly acid to litmus, decomposes the carbonates readily, and its salts are not decomposed by acetic acid. The salts of potassium, sodium, and copper are crystalline; that of barium amorphous; and they are all soluble in water and insoluble in absolute alcohol. The new acid possesses the property of reducing alkaline solutions of copper and bismuth, as also the salts of silver. It is decomposed rapidly when heated to 100° C. (= 212° F.). Ph. Centralhalle, No. 31, p. 258.

Urea.—Chichester A. Bell, in connection with his paper on cyanate of potassium (which see elsewhere in this report), draws attention to the facility with which artificial urea may be prepared from the crude mass obtained by his process for the cyanate. $4\frac{1}{4}$ parts of sulphate of ammonium are added to the aqueous solution obtained as indicated in his process, the solution is evaporated to dryness, extracted with boiling alcohol, etc. From 1 ounce of dried ferrocyanide of potassium, 25 per cent. of pure urea may be readily obtained with very little trouble, and the process furnishes a capital exercise for students. He finds amylic alcohol a much better crystallizing medium than ordinary alcohol for purifying small quantities of urea. Ch. N., August 27th, 1875, p. 100.

C. A. Pekelharing, after an examination of the various known methods for the determination of urea in the blood and the tissues, concludes that they merit but a limited confidence; the direct determinations because the nitrate and oxalate of urea are not absolutely insoluble in nitric and oxalic acids, even when concentrated; and the indirect analyses because the products of decomposition which serve for the determination are not characteristic of urea, but may likewise be yielded by other substances. Hence the theories on the origin of urea founded on such determinations are doubtful. Ch. News, October 8th, 1875, p. 180; from Arch. Néerlandaises des Sciences, No. 1, 1875.

Cholesterin.—The experiments of C. Méhu prove cholesterin to be heavier instead of lighter than water, as has been hitherto assumed. Its sp. gr. is 1.046. Zeitschr. Anal. Ch., Nos. 3 and 4, 1875, p. 379.

Biliary Coloring Matters.—Detection in Urine.—O. Rosenbach proposes the following simple method for the detection of biliary coloring matters in urine: The icteric urine is allowed to pass through ordinary white filtering-paper, whereby the paper assumes an intense yellow to brown color; if now a drop of faintly fuming nitric acid is dropped on the inner surface of the filter, the paper, at the point of contact, assumes a yellow color, which changes to yellowish-red, with handsome violet edge; on the periphery an intensely blue ring is formed, and around this an emerald green circle gradually becomes visible. The colors remain side by side for some time (often several hours). The nitric acid should be applied while the filter is still moist, as when allowed to dry, the reactions are not so distinct. With such dried paper, however, the inverse color reaction may be obtained by moistening a portion with distilled water, and then touching the moistened spot with nitric acid. An immediate and magnificent emerald green spot is produced, the centre of which gradually becomes blue, and the centre of this, finally, assumes a red violet color. Ph. Centr. Halle, No. 19, 1876, p. 161.

REPORTS OF COMMITTEES.

REPORT OF THE COMMITTEE ON THE DRUG MARKET.

FOR THE FISCAL YEAR ENDING JUNE 30TH, 1876.

THE drug business for the past year has suffered with the general depression experienced in all manufacturing and commercial interests. Prices have with a few exceptions been lower than the previous year, purchases have been made mostly to meet actual wants, consequently little disposition was shown to speculate.

Congress has again sought to alter the present tariff, and during the session much uneasiness was felt by those holding goods likely to be affected by the change; Congress adjourned, however, without passing the bill. Annexed to this report will be found the bill as amended by the Ways and Means Committee.

The importations for the year have been mostly confined to quantities to meet the legitimate demands of the regular trade; it therefore lacked that life usually shown in more prosperous times. It is hoped a more confident feeling may exist in commercial circles, and with the present low prices an active fall business may be done, and at more remunerative prices.

From the Bureau of Statistics we derive the encouraging fact that our exports exceed the imports. The total value of exports for the year ending June 30th, 1876, was $596,555,531 and the imports for the same period $476,468,258; balance in favor of exports $120,087,273. The decrease in imports over the previous year being $77,437,895, and in exports $9,019,522, it is very gratifying to know the exports did not fall off in proportion to the decline in imports.

Your particular attention is called to the importance of guarding against the cheap powdered drugs offered by dealers, many of which are sold at the price of the crude article, which fact proves them to be adulterated, or the crude drug of an inferior quality. Dispensing pharmacists cannot exercise too much caution in purchasing drugs in powdered state, and unless procured from a reliable source should be subjected to close examination. The chairman of your committee regrets being unable to give reports from the other members of the committee; it would have been of interest to our Association to have had them.

A few quotations for powdered drugs, as found on several lists, are here given.

Powdered Cape Aloes 16 cents, cost price of crude 13 cents; averaged loss in drying, in powdering, and cost of powdering, 40 per cent. on present price of crude.

Powdered Asafœtida 23 cents, cost price of crude 13 cents to 20 cents; averaged loss in drying, in powdering, and cost of powdering, 75 per cent. on present price of asafœtida.

Powdered Cantharides $1.20, present value of flies $1.25; cost of powdering same, including loss, 11 per cent.

Red Bark, powdered, 10 cents to 90 cents.

Powdered Yellow Bark, 6 cents to 15 cents.

Ipecac Root $1.15, cost of whole root $1.14.

Rhubarb Root 70 cents, cost of whole root 75 cents to $1.50.

Antimony 2 cents to 16 cents.

Other articles could be named, but the above are sufficient to show the importance of some action being taken to protect the trade from such doubtful powders.

Alcohol has been largely exported during the year; as American is preferable for certain purposes in Europe, and has met there with pretty active sales at full prices, prices here have been steady at about $2.18 per gallon, with a good supply.

In the proposed tariff it is provided that *Alcohol* to be exclusively used for the manufacture of ethers, chloroform, and the vegetable alkaloids, made free of duty by this act, may be withdrawn from bond free of the specific internal revenue tax per gallon, in quantities not exceeding one thousand gallons at any one time, under such rules, regulations, and bonds as the Secretary of the Treasury shall prescribe.

Beans.—Tonka have been scarce at times, and prices have fluctuated widely between 90 cents and $3.50 per pound, now worth $1.25, with small demand. *Vanilla.*—Considerable quantities of immature beans were thrown on the market, but fortunately met with low prices; good quality sold at prices ranging from $16 to $20.

Borax is still very much reduced in price; the demand has been moderate, owing to the general depression among manufacturers.

The entire production from the States of California and Nevada last year amounted to 6,000,000 pounds; of this amount nearly 3,000,000 pounds were exported. It is thought an improvement on present prices will soon take place.

Balsam Tolu.—The supply has been small; prices have varied considerably, the lowest being $1.25 and the highest $4 per pound. Several spurious lots were met with; the high price being a temptation to adulterate it. *Copaiba* in large stock; price weakening.

Bromine by competition has been selling at little profit for some time; price advanced in the early part of the year; *Bromide of Potassium* followed, and advanced from 55 cents to 70 cents per pound. Large quantities of this article are still exported.

Carbonate of Ammonia suffered a great decline; price fell from 17½ cents to 13½ cents, gold, but has since improved. It is thought the price was affected by several new manufacturers starting. Our London correspondents write: "The new make is suspended at present and for the moment we can only buy Hill's at 5*d.* less 2½ per cent. discount; will likely advance." A very handsome article is now made in this country, but at a higher price than the imported. In the proposed tariff, this article now paying a duty of 20 per cent. will be made free.

Citric Acid.—This article is now manufactured in Philadelphia, fully equal to the imported, and at the same price. Owing to the advance in lime-juice, citric acid advanced to 82 cents, gold; present price in London 2*s.* 7*d.* per pound.

Cantharides is in large supply; price has steadily declined during the year from $1.50 to $1.15 per pound, closing weak at last quotation.

Canary Seed.—The old crop becoming very much reduced and the new not expected for some time, prices rapidly advanced to $10 per bushel; buyers, however, were very cautious and only bought enough to meet their immediate wants, and wisely did they act, for with the new crop prices declined slowly until in June it had reached $5.50. *Hemp Seed* of good quality varied very little from $2.00 per bushel.

Castile Soap.—White, Conti's make, was in good demand. This article affords a small profit; sellers are so apt not to take into consideration the great shrinkage in weight, often reaching five pounds per box, in transit to this country.

Camphor.—Crude, the stock being equal to the wants of the refiners, prices for the refined were steady at 27 cents during the season.

Chamomile Flowers.—*German* were in moderate supply at 40 cents for prime; *Roman* of bright color brought 25 to 30 cents per pound.

Glycerin.—Owing to the competition among the manufacturers of this article, prices ruled low; an advance is likely to occur should the demand increase.

Gum Arabic.—True gum has been in good demand at fair prices. First picked has been firm at 52½ cents per pound; sorts of prime quality have advanced two cents per pound. Much *sennaar* gum is sold for true; many buy it ignorant of the difference, or governed by its low price, first picked being worth 38 cents per pound.

Tragacanth continues in small stock; prices are very firm, and an advance will take place, should much of a demand occur. *Aloes, Cape*, good quality has not been abundant, and prices have fluctuated according to the supply, from 9 cents to 13½ cents per pound. *Barbadoes* can still be had at low prices and good quality. *Socotrine*, a very fine quality, has lately been imported in skins at price of softer kind in kegs, say 55 cents to 60 cents per pound. *Asafœtida* met with a slight advance last fall during the prevalence of the horse disease; the stock being very large, the advance could not be maintained; good quality is worth from 16 cents to 22 cents; by the proposed tariff the duty of 20 per cent. will be taken off.

Opium, quotations for the year have not varied much; monthly gold prices were as follows:

July, . . .	$5.20,	in Smyrna,	130 p.
August, . . .	5.25,	"	135 p.
September, . .	5.25,	"	135 p.
October, . . .	5.40,	"	145 p.
November, . .	5.45,	"	145 p.
December, . .	5.30,	"	142 p.
January, . .	5.12½,	"	136 to 140 p.
February, . .	5.00 to $5.25,	"	132 to 135 p.
March, . . .	5.00 to 5.25,	"	135 p.
April, . . .	5.00 to 5.12,	"	130 to 135 p.
May, . . .	4.75 to 5.00,		125 p.
June, . . .	5.25 to 5.75,		150 p.

During February the Dutch government was paying up to 160 p. for particular selections. Price now very firm and likely to advance; the new crop thought to be small. According to the most reliable information received from Smyrna, the present crop will reach nearly 4000 baskets; stock of old and new 1200 baskets.

Opium Arrivals, from June 1st, 1875, *to May 31st,* 1876.

Smyrna,	4888	baskets.
Constantinople,	1800	"
	6688	"
Balance remaining in the interior, about	300	"
Total amount of the crop, 1875–1876,	6988	"

It is very difficult to arrive at the exact amount of the new crop, but the above is thought to be a fair statement. Some writers from Smyrna state the crop will not be over 3500 baskets; they also write that the first of the new crop was satisfactory as regards color and quality, but that which is now coming will be dark in color, owing to the continuous rains; the intrinsic value is in no way affected by the color. *Morphia* has advanced with opium; a still further advance is likely to take place.

Oxalic Acid has been in small demand, and has remained steady at 10½ cents gold.

Manna.—The crop being small and controlled by a few houses, price was advanced from 45 cents to 70 cents.

Senna, Alexandria, has been selling below the cost of importation, owing to the large stocks held here, and when the quantity was reduced, prices advanced from 13 cents to 20 cents per pound; prime sifted is worth 30 cents. *Buchu, short,* has been very low for the past two years; prices are now improving. *Long buchu* has also advanced; was selling during the first part of the year at 27 cents, now brings 45 cents, and in good demand.

Oils. Lemon, fine qualities, which were selling in March at $2.75 gold, rapidly advanced to $3.50, at which price it is now selling. *Bergamot* was somewhat excited; rose from $3 to $3.90 gold per pound. *Sassafras* continues a drug on the market; the price has been so low, that little has been made lately, and we may expect an advance as soon as the present stock is reduced. *Wintergreen.* The market is being overstocked, and prices are declining; the same may be said of most of the domestic oils. *Rose.* The sudden changes, together with the war in Turkey and continuous dry weather, have been injurious to the growth of roses, and the crop of oil will be a short one. Prices will most likely advance still further; the present price of $6.50 gold per ounce is considered very low.

Wax, yellow, has not been in very heavy stock; full prices were asked during the entire year; prime brought 35 cents. A considerable quantity of an adulterated article is now in this market, being of bright color, but easily recognized as impure. A substitute for beeswax is now offered by a New York firm; the article is called *Ceresin Wax*, a purified product obtained from the large coal-beds of Drohobriz in Austria. A sample accompanies this report.

Quicksilver has been very much excited at times, fluctuating between 52 cents to 92 cents gold; present quotation 60 cents. The quantity of mercury produced on the Pacific coast for the past year, amounted to about 54,000 flasks; the total production throughout the world reaches nearly 100,000 flasks.

Quinine Sulphate.—The demand has been good, with an ample supply of American to meet all demands; price steady during the year at $2.30. There is every prospect of quinine being in great demand this fall, and with the high price of cinchona barks an advance is likely to occur.

Your chairman was unable to receive an official report of the imports into the port of New York in time for publication.

In closing, I would say that I regret not being able to have presented you with a more full and useful report, but trusting it will be of some interest to the Association,

I remain, very respectfully,
Richard M. Shoemaker,
Chairman.

Appendix to Drug Report.

The following changes will take place in the tariff bill, should the proposed bill as amended by the Ways and Means Committee pass at the next session of Congress.

	Proposed.	Present Duty.
Acetate of Ammonia,	Free.	25 cts. per lb.
" Baryta,	"	25 " "
" Copper,	"	10 " "
" Iron,	"	25 " "
" Lead, brown,	"	5 " "
" " white,	"	10 " "
" Lime,	"	25 " "
" Magnesia,	"	50 " "
" Potassa,	"	25 " "
" Soda,	"	25 " "
" Strontia,	"	25 " "
" Zinc,	"	25 " "
Acid, acetic, and pyroligneous acid, over 1.047 specific gravity or less,	"	30 " "
Acid, acetic, over 1.047 specific gravity,	"	5 " "
" Benzoic,	"	10 per cent.
" Carbolic,	"	10 "
" " liquid,	"	20 "

	Proposed.	Present Duty.
Acid, Chromic,	Free.	15 per cent.
" Citric,	"	10 cts. per lb.
" Gallic,	"	$1.00 "
" Nitric,	"	10 per cent.
" Sulphuric (Nordhausen),	"	1 ct. per lb.
" Tannic,	"	$1.00 "
" Tartaric,	"	15 cts. per lb.
Acid of every description used for medicinal purposes, or in fine arts, not otherwise provided for,	"	10 per cent.
Alum, patent alum, alum substitute,	"	60 cts. per 100 lbs.
Alumina sulphate and aluminous cake,	"	60 " "
Ammonia, carbonate and sulphate,	"	20 per cent.
" muriate,	"	10 "
Antimony, crude and regulus,	"	10 "
Asphaltum,	"	25 "
Asafœtida,	"	20 "
Barytes, sulphate and nitrate,	"	20 "
Beeswax,	"	20 "
Benzoates,	"	30 "
Bladders, manufactures of,	"	30 "
Borax, refined,	"	10 cts. per lb.
Brimstone, in rolls,	"	$10.00 per ton.
Calomel,	"	30 per cent.
Camphor, refined,	"	5 cts. per lb.
Chloroform,	"	$1.00 "
Cobalt, oxide of,	"	20 per cent.
Copperas,	"	½ ct. per lb.
Dextrin,	"	10 per cent.
Lime-juice,	"	10 "
Magnesia, carbonate,	"	6 cts. per lb.
" calcined,	"	12 " "
Mineral, kermes,	"	10 per cent.
Oil, cod-liver,	"	20 "
Polishing powders of all descriptions,	"	25 "
Red precipitate,	"	20 "
Resins, gum, not otherwise provided for,	"	20 "
Rosin,	"	20 "
Rochelle salts,	"	5 cts. per pound.
Epsom "	"	1 " "
Glauber "	"	½ " "
Santonin,	"	$3.00 " "
Sponges,	"	20 per cent.
Strychnia, salts of,	"	$1.00 per ounce.
Sulphur, flowers,	"	$20 per ton; 15 p. c. ad val.
Tartar emetic,	"	15 cts. per lb.

Provided, That alcohol, to be exclusively used for the manufacture of ethers, chloroform, and the vegetable alkaloids, made free of duty by this act, may be withdrawn from bond free of the specific internal revenue tax per gallon, in quantities not exceeding one thousand gallons at any one time, under such rules, regulations, and bonds as the Secretary of the Treasury shall prescribe.

Philadelphia Imports of Drugs and Chemicals for the Year ending June 30th, 1876.

	Quantity.	Value.
Argols,	690,670 lbs.	$109,337
Asphaltum,		3,442
Chalk,		3,270
Cement,		13,192
Chemicals and drugs,		808,870
Chloride lime,	8,135,600 lbs.	162,013
Cochineal,	79,804 "	36,462
Corks and cork wood,		93,180
Cutch,	82,328 lbs.	4,347
Dyewoods,	113,663 cwts.	120,944
Gums,		41,054
Glucose,		6,649
Indigo,	45,865 lbs.	40,958
Honey,	7,587 galls.	6,073
Hops,	28,081 lbs.	10,059
Kryolite,		103,530
Madder,	68,022 lbs.	4,102
Oils, olive,		22,409
" sundry,		9,967
Opium,	152,400 lbs.	543,737
Plumbago,		7,108
Soap, castile and fancy toilet,		24,370
Soda, bicarbonate,	33,600 lbs.	823
" carbonate,	34,548,555 "	590,954
" caustic,	2,683,960 "	84,762
Spices,	11,753 "	23,132
Sponges,		4,481
Quicksilver,		16,088
Soda, nitrate of,	5,360,905 lbs.	131,431
Sulphur,	12,549 tons.	385,071
		$3,411,819

Drugs and chemicals exported,	$214,416
Total amount of imports of all kinds into the *Port of Philadelphia*,	$22,483,389
Total amount of *exports* from *Philadelphia*,	$40,254,075
Exports in excess of imports,	$17,770,686
Increase of exports over the year ending June 30th, 1875,	$11,666,056

ABSTRACT OF A REPORT UPON THE DRUG MARKET OF CALIFORNIA.

BY JAMES G. STEELE, OF SAN FRANCISCO, CAL.

San Francisco is becoming a great world-centre for the importation and exportation of drugs, chemicals, druggists' sundries, fancy goods, oils, perfumery, spirits, natural and manufactured products, etc., etc.; also, a manufacturing city, as will be noted by a glance at the extent and variety of manufactures:

Imports of San Francisco for 1875.

Foreign imports (by sea), $30,000,000; domestic imports, by rail, etc., $51,500,000; total imports for 1875, $81,500,000.

Imports of drugs, chemicals, fancy goods, druggists' sundries, oils, naval stores, spirits, including wines, brandies, alcohol, etc., into the port of San Francisco, for the year 1875, amounting to $14,000,000.

I. *Number of Stores devoted to the Drug Business in the Pacific States and Territories.*

Stores in San Francisco,	98	
" " California (outside of San Francisco),	267	
Total in California,		365
Stores in Oregon,	73	
" " Nevada,	43	
" " Washington Territory,	18	
" " Idaho,	14	
" " Montana,	14	
" " Utah,	23	
" " Arizona,	7	
		192
Total Stores in Pacific States and Territories,		557

Invasion of the State by an army of commercial travellers upon the completion of the Transcontinental Railroad.

The evil of redundancy of stock in drug stores, and the great modern American humbug of pharmaceutical specialties, consisting in part of troches, elixirs, pills, wines, fluid extracts, syrups, etc., etc.

II. Details of the imports of acids, chemicals, drugs and dyestuffs, druggists' sundries, fancy goods, glassware, mineral waters, naval stores, oils, organic matters, paints, paper, perfumery, soaps, twines, ship furniture, etc.

III. Account of some of the natural products of California and Nevada, consisting in part of metals, minerals, organic matters, vegetable products, mineral waters, etc.

Yield of the precious metals for the Pacific States, for the year 1875, $100,000,000.

Products (other than precious metals and manufactures) of California, for the year 1875, $124,000,000.

IV. *Manufactures of San Francisco and California.*

Some account of the different manufacturing establishments of California, more or less intimately connected with the drug business, either furnishing to the trade the products of manufacture or drawing upon it for their supplies.

Number of such manufactories in San Francisco, 432, being establishments devoted to the manufacture of acids, alcohol, antimony, borax, chemicals, candles, glassware, glue, glycerin, giant powder, ink, malt, matches, mustard, patent medicines, paints, paper, perfumery, soaps, spirits, such as brandies, cordials, liquors, wines, etc., syrups, squirrel poison, tallow, trusses, vinegar, yeast powders, etc., etc.

Total value of manufactures of San Francisco for the year 1875, $65,000,000.

V. Manufactures of California, outside of the city of San Francisco, consisting in part of borax, brewers' products, coffee, spices, etc.; fuses for miners, mineral waters, mining of gold, silver, and other valuable or useful metals, quicksilver, sulphur, sugar, vinegar, etc., etc.

Amount of quicksilver produced in California during the year 1875, 50,000 flasks, valued at $3,200,000.

VI. Exports of San Francisco, consisting in part of antimony, barley, brandy, borax, base bullion, copper, cochineal, coal, flax, flaxseed, glue, giant powder, honey, hops, lead, malt, mustard, mustard seed, marble, nutmegs, oils, oranges, ores, powder, pepper, paper, quicksilver, rice, raisins, sugar, syrups, slag, seeds, tar, tan bark, tea, wines, etc.

Value of exports of San Francisco for the year 1875, exclusive of treasure, $45,000,000; exports of treasure, gold and silver, $46,900,000.

VII. Tables of imports, foreign, by sea, for 1875.
" " domestic, by railroad, for 1875.
Natural products of California "
Manufactories and manufactures "
Exports by sea "
" by rail "
Price-lists of drugs, dyestuffs, chemicals, oils, spirits, and various manufactured articles.

San Francisco, August 29th, 1876.

REPORT OF THE COMMITTEE ON ADULTERATIONS AND SOPHISTICATIONS.

Your committee respectfully reports, that owing to inadequate returns to advertisements and direct communications for contributions, experienced by former committees, we depended entirely on whatever information we could gather from journals accessible to us, and some stray facts coming under our own observation; the only direct communication coming from the Pharmaceutical School of the University of Michigan, under the direction of Prof. Prescott and Prof. Harrington, to which gentlemen we desire herewith to tender our thanks for their services.

In preparing this report it has been our aim to prevent repetition and to make clear and explicit abstracts, referring to the sources of information for those desiring further particulars.

We would call particular attention to the outrageous frauds practiced in the adulteration of spices and cream of tartar, the former having reached such a degree that the demand for worthless mixtures, with which the adulterations are made, has led to a distinct branch of industry, in which unprincipled speculators have invested their capital for the sake of gain by defrauding the public. When we consider that these mixtures are almost exclusively used for culinary purposes, passing from the hands of the grocer, and even a large number of dealers in drugs who have no means or are unable to test them, into the hands of the public, for prices which are far above their real value, we deem it high time that these vile swindlers engaged in this disreputable business, on par with a counterfeiter, should also be treated to a similar punishment; or, to say the least, be obliged to label their packages giving composition of their contents, and that steps ought to be taken to accelerate the establishing of a central bureau for detection of adulterations, as proposed by your committee in 1874.

CRUDE DRUGS AND COMMERCIAL PRODUCTS.

Anise.—In the neighborhood of Wishau and Rausnitz, in Moravia, is found a gray clay, formed into small roundish granules by the action of earthworms. This granular clay is used by dealers to adulterate the anise fruit to the extent of 20 per cent. By dropping a pinch of the suspected anise upon white paper, from the height of about 12 inches, the adulteration known as anis earth is readily detected. Am. Journ. Pharm., 1876, p. 328; Apoth. Zeitung, No. 20.

Arrowroot.—H. P. Madsen received some time ago an original package of arrowroot, the appearance of which was all that could be desired. It dissolved completely in boiling water, but did not form a thick mucilage. Examined under the microscope it presented elliptical grains, about three times as large as those of maranta, and mostly provided with a well-developed hilum, which latter characteristic points to tacca fecula from Tacca pinnatifida. He also mentions having received two packages with damaged arrowroot; in the first the musty smell pervaded the whole contents, the second keg, however, presented nothing unusual in the top layer, but the last half of it was musty. Mr. Madsen, therefore, recommends to examine the whole package, and not be satisfied with a small sample from the top. Am. Journ. Pharm., 1876, p. 316; Ny Pharm. Tid., 1876, p. 140.

Balsam Tolu.—Rich. V. Mattison found this article adulterated to the extent of 63 per cent., with a balsam prepared from the bark of Liquidambar orientale, and nearly 11 per cent. of bark and charred ligneous matter. Am. Journ. Pharm., 1876, p. 52.

Balsam of Copaiva.—John M. France found a lot to be a mixture of linseed and castor oils, with sufficient oil of turpentine and balsam of copaiva to give consistency and impart copaiva odor. Pharmacist, 1875, p. 322.

Cayenne Pepper.—A lot of ground capsicum was received by the writer, which on examination by Prof. Harrington proved to be a mixture of over 50 per cent. turmeric, wheat, and corn-starch, and a small percentage of horseradish.

Dragon's Blood.—By Mr. Henry Bretet.—True dragon's blood is not scratched by the finger-nail, yields a red, non-adherent powder, when heated gives red vapors, and is found to contain very little iron. False dragon's blood, which appears to be made by mixing oxide of iron with resin, differs in each of these particulars, but sometimes imparts a purple red color to alcohol, proving that some true dragon's blood had been used in manufacturing the imitation. Am. Journ. Pharm., 1876, p. 236.

Ergot.—Mr. Henry Trimble exhibited an unknown substance, at the pharmaceutical meeting of the Philadelphia College of Pharmacy, which had been sent from Maryland, to be sold for powdered ergot. It had no resemblance to the drug. Am. Journ. of Pharmacy.

Golden Seal.—A lot of about 500 pounds of Hydrastis canadensis offered for sale in Cincinnati, proved on examination to be about one-half beet-root, while mixed throughout the entire mass was serpentaria, cypripedium, sanguinaria, May apple, and other substances. Am. Journ. Ph., 1876, p. 226.

Gum Labdanum.—X. Landerer states that this gum is often sophisticated during the melting process with olibanum, mastich and other resins. Am. Jour. Pharm., 1875, p. 499.

Honey.—A fine lot of honey, of fine color and flavor, styled "boxwood-flower," proved on examination to be a fine specimen of syrup made from corn-starch. J. M. France, Pharmacist, 1875, p. 322.

Hyoscyamus.—In a lot of hyoscyamus, purchased in New York, the writer found bay leaves, straw, feathers, oats, stone, branches from unknown plants, and wood, to the amount of about 8 per cent.

Mustard.—Out of eight samples of ground mustard examined at the Michigan University, under the direction of Prof. Harrington, but one was found pure, the rest were mixed with various proportions of corn-starch, wheat-starch, turmeric, corn-meal, and wheat flour.

Oil of Cade.—J. M. France found some of this oil to be simply liquid tar, flavored with oil of juniper. Pharmacist, 1875, p. 322.

Oil of Chamomile.—John M. France reports of having observed essential oil of chamomile, composed of castor oil and alcohol, flavored with pure oil of chamomile, and colored with solution of litmus. Pharmacist, 1875, p. 322.

Oil of Cloves, adulterated with carbolic acid, has been met with. A test for this adulteration has been devised by Flückiger, based upon the fact noticed by Berthelot, that ammoniacal phenol is colored blue by hypochlorite of lime. It consists in agitating 6 to 10 grams of the oil of cloves with 50 to 100 times its weight of hot water, decanting after cooling, concentrating the clear liquid at a gentle heat to a few cubic centimetres, then adding 1 drop of ammonia and a pinch of chloride of lime. If the oil contains carbolic acid, the liquor on shaking acquires a green color, which changes into blue, and remains persistent during several days. Drug. Circ., 1875, p. 174.

Adulteration of oil of cloves was also noticed by Ed. Shaer. It had a sp. gr. 0.960, and boiled between 165° and 170° C. Pure oil of cloves varies in sp. gr. between 1.03 and 1.06, boils between 240° and 255° C. The adulteration amounted to about 40 per cent. of a lighter oxygenated oil, the nature of which was not determined. Am. Journ. Pharm., 1875, p. 398.

Oil of Peppermint is largely adulterated; the most successful seems to be the addition of from 10 to 20 per cent. of freshly distilled oil of pennyroyal. The following seems to be a perfect test: Take for test solution 1 drachm chloral hydrate, $\frac{1}{2}$ a drachm sulph. acid, C. P., rub together in a glass mortar, and add alcohol, drop by drop, until a clear solution results. In a watch-glass put a few drops of the oil to be tested, and with a glass rod add an equal quantity of the test, rubbing briskly for a moment; after standing for a few minutes, if there is adulteration with pennyroyal, the mixture will assume a dirty olive green color, which grows darker on standing. Pure oil of peppermint will assume a rich cherry-red under similar treatment. Drug. Circ., 1875, p. 163.

Oil of Rose.—Dr. Miller obtained from an ounce of oil of rose, purchased as the best in the market, eight grains of spermaceti. Am. Journ. Pharm., 1876, p. 227.

Oil of Wintergreen.—Specimens adulterated with chloroform and oil of sassafras have been found on the market. A mixture of 4 parts of oil of sassafras and 1 part each of chloroform and oil of wintergreen has a specific gravity nearly the same as oil of wintergreen. The presence of chloroform can easily be detected by shaking the mixture in a moderately warmed test-tube, when the odor of chloroform will be perceptible; by fractional distillation between 60° and 70° C. the chloroform can be separated. The residue treated with nitric acid will show the presence of oil of sassafras by turning it dark red. E. Jacobsen's Chemisch-Technisches Repertorium, 1874, I, p. 268.

Orchil.—M. Hock reports having received a sample of orchil containing a small percentage of orchil, but a large portion of fused residue of fuchsin obtained in the manufacture of fuchsin, containing a considerable quantity of arsenic. This circumstance makes this adulteration a dangerous one, as it is frequently used by confectioners for coloring confections. E. Jacobsen's Chem. Techn. Repertorium, 1874, I, p. 268.

Pepper.—During several years past acorns have been used in Germany in large quantities for the adulteration of black pepper. The acorns were turned into small globes, suitably dyed, and mixed with true pepper. Trade report of Gehe & Co.; Am. Journ. Pharm., 1875, p. 336.

To the list of materials used for the adulteration of pepper, given in last year's report, A. Winter Blyth adds the following: Pepper leaves, sago, rape-seed, potato, spices, capsicum, guinea pepper, chicory, rye, powdered laurel leaves, stones from olives, bone-dust, marine salt, and various mineral adulterations. To make the berries of lighter sorts equal in weight to the heavy Malabar and Penang, they are macerated in salt brine to make them heavier.

Accum noticed artificial pepper-corns made of oil cake, common clay, and cayenne pepper. Chevallier stated recently that in 1843 he found pepper adulterated with from 15 to 20 per cent of matter composed of pepper-dust, bran, and other matters. Chemical News; Pharmacist, 1876, p. 24.

Pink Root.—The writer found, in a lot of ten pounds of this root, about 6 per cent. of golden seal root, small branches, and straw.

Sarsaparilla Root.—Mr. J. J. Brown found, on garbling some sarsaparilla root, the following collection: Nutgalls, matico stems, bay, belladonna, and digitalis leaves, paper, unknown bark, straw, ipecac, and May apples. Am. Jour. Pharm., 1876, p. 53.

Serpentaria Root.—The same gentleman found, in a package of this root, not only serpentaria, but also the fruit of ground cherry, capsules of an unknown plant, stems and leaves of serpentaria, onion husks, charcoal, snail shells, bits of wood, glue, ginseng, and gravel. Ibid.

Wax.—Beeswax adulterated with 20 per cent. of resin has been sold to several druggists in Berlin. The specific gravity of pure wax being between 0.960 and 0.963, it will float on water of ammonia of .960 specific gravity, while a sample adulterated with resin, having higher specific gravity, will sink in the same liquid. Am. Journ. Pharm., 1876, p. 65.

CHEMICALS AND PHARMACEUTICAL PREPARATIONS.

Bromine.—Reyman found a specimen of bromine to be contaminated with about 10 per cent. of foreign substance, which he found to consist largely of bromoform. The characteristic odor of bromoform, which is particularly strong, produced when the bromine containing it is mixed with a solution of iodide of potassium, is a sure proof of its presence. Scient. Amer., January, 1876, p. 5.

Carbolate of Lime.—Chemical analysis has shown that most of this article in the market is nearly worthless, containing hardly any phenol, but owe their smells to various tar oils possessing little or no disinfectant power. Am. Journ. Pharm., 1876, p. 278.

According to an analysis of carbolates of lime, as found in the market by Jeremiah Coughlin, the following results are obtained:

Bellevue carbolate of lime, Dewey & Moore, contains 21.24 per cent. of carbolic acid. Calvert's carbolate of lime contains 26.55 per cent. of carbolic acid. Carbolate of lime, Billings, Clapp & Co., contains 10.62 per cent. of carbolic acid. Crude carbolated powder, Pittsburg Tar and Chemical Works, contains 7.43 per cent. of carbolic acid. The bulk of these preparations is made up of carbonate of lime, hydrate of lime, sulphate of lime, sand, and organic matter.

Another disinfectant closely allied to this class, although not belonging under this head of our classification, might be noticed here; phénol sodique, Hance Brothers & White, was found to contain 11.3 per cent. of carbolic acid.

Citrate of Iron and Quinine.—W. J. Holloway examined six samples of the above, as found in the market, with the following result:

No. 1, ...	5.2	per cent	of alkaloids.
" 2, ...	12.2	"	"
" 3, ...	8 75	"	"
" 4, ...	9 00	"	"
" 5, ...	11.4	"	"
" 6, ...	8.3	"	"

Standard, as found by analyzing a sample made according to the U. S. Ph., 14.98 per cent of alkaloid.

Cream of Tartar.—Twelve samples of cream of tartar as found in so many retail establishments, were examined by Herman M. Royse, with the following results:

Samples.	Bitartrate of Potassa. Per cent.	Tartrate of Calcium. Per cent.	Sulphate of Calcium. Per cent.	Sulphate of Potassa. Per cent.	Alum. Per cent.	Total.
1	83.73	5.07	7.2	....	....	100.
2	....	34.21	44.2	....	19.3	97.71
3	86.84	13.16	....	....	....	100.
4	88.76	11.24	....	....	....	100.
5	....	....	74.50	....	24.3	98.8
6	....	61.44	26.00	10.61	....	98.5
7	....	41.54	37.40	19.00	....	97.94
8	....	23.68	75.20	....	....	98 88
9	....	32 96	65.5	....	....	98.46
10	63.34	36 66	....	....	....	100.
11	....	....	99.9	....	....	99.9
12	....	23 68	75.00	....	....	98.68

Fluid Extracts.—Comparative analysis of certain fluid extracts, by H. C. Schrank. The following fluid extracts were analyzed with results as shown in table:

FLUID EXTRACTS.

Comparative Analysis of certain Fluid Extracts, by H. C. Schranck.

Samples.	NUX VOMICA.				STRAMONIUM.			BELLADONNA.			CONIUM.			HYOSCYAMUS.			VERATRUM VIRIDE.		
	Test solution, c.c.	Strychnine.	Brucin.	Sp. Gr.	Test solution, c.c.	Atropia.	Sp. Gr.	Test solution, c.c.	Atropia.	Sp. Gr.	Test solution, c.c.	Conia.	Sp. Gr.	Test solution, c.c.	Hyoscyamia.	Sp. Gr.	Test solution, c.c.	Alkaloids.	Sp. Gr.
1. E. R. Squibb......................	96.	0.7	1.0	0.835	(10.8 Seed.)	0.19	0.856	12.8 (Root.)	0.22	1.010	19.2	0.8	1.030	8.0	0.05	1.018	30.0	0.8	0.925
								20.8 (Leaf.)	0.37	0.953									
2. Lazelle, Marsh & Gardiner.	80.	0.56	0.9	0.968	(3.0 Leaf.)	0.05	1.055	13.06	0.24	1.023	15.2	0.64	1.050	7.2	0.05	1.054	20.0	0.5	0.977
3. McKesson & Robbins........	90.	0.6	0.97	1.000	(2.4 Leaf.)	0.04	1.060	12.00	0.21	1.091	......	......	....	6.0	0.04	1.070	20.0	0.5	0.965
4. Henry Thayer & Co.	50.	0.38	0 52	0.857	(7.2 Seed.)	0.12	1.029	11.02	0.2	1.082	8.0	0.3	1.057	4.8	0.03	1.082	12.0	0.3	1.020
5. Tilden & Co......................	......	......	......	....	(8.4 Seed.)	0.15	1.006	(16.00 Root.)	0.28	0.983	12.0	0.5	0.997	4.2	0.02	0.976	12.8	0.34	0.883
6. Hance, Bros. & White........	76.8	0.58	0.82	0.894	(3.6 Leaf.)	0.06	1.011	12.08	0.22	1.057	(5.3 Leaf.)	0.2	1.086	5.6	0.03	1.020	18.4	0.49	0.942
7. Burroughs Mfg. Co...........	......	......	......	....	(6 4 Leaf.)	0.11	0.951	....	......	....	....	......	....	4.8	0.03	0.980	20.0	0.5	0.908

Am. Jour. Phar., 187, p. 250.

Fluid Extract Cinchona Calisaya, U. S. P. Mr. Charles Grimwood having selected this subject for his thesis. In purchasing his samples he found it quite difficult in some localities to obtain the fluid extract of Calisaya bark, as a great many druggists keep only extracts made from inferior barks, claiming that they were just as good, and answered all the purposes.

The following is the result of seven different samples:

Samples.	Per cent. of Alkaloid.	Per cent. of Quinia.	Per cent. of Astringent.
1	1.1	.95	22
2	.27	.22	14
3	Too little to be estimated.	....	7
4	.43	....	15
5	3 07	2.03	35
6	.6	....	20
7	2.2	1.55	20

Iodide of Potassium.—Thomas F. Best has found in five samples the following excess of alkali, consisting chiefly of carbonates: 5.44, 5.35, 2.32, 1.78, and 0.53 per cent. Commercially pure iodide should not contain more than from 0.15 to 0.20 per cent. Am. Journ. Pharm., 1876, p. 271.

Muriatic Acid.—E. Scheffer reports a contamination of a sample of muriatic acid, examined by him with lead. Am. Journ. Pharm., 1875, p. 485.

Resinoids.—Several of the resinoids as found on the market were analyzed by L. F. Beach and J. R. Little, with results as given below.

Aconitin.—Sample 1, Keith's, contained 4.5 per cent. alkaloid and 5.4 per cent. magnesia carbonate. Sample 2, Parke, Davis & Co., contained 4.3 per cent. alkaloid.—J. R. LITTLE.

Cimicifugin.—The samples examined were found to be nearly entirely soluble in alcohol.

Comparative Solubility.

	1.	2.
Soluble in Benzin,	0.11	0.152
Insoluble "	0 89	0 848
Soluble in Water,	0.035	0.092
Insoluble "	0 965	0.908

L. F. BEACH.

Hydrastin.—Samples examined gave following results:

Approximate amount of Alkaloids and Matter insoluble in Hot Water.

Samples.	Berberina weighed as Hydrochlor.	Hydrastia.	Insoluble matter.
1	0.351	0.017	0.250
2	0.219	0.174	0.211
3	0.069	0.067	0.235
4	0.280	0.051	0.296
5	0.360	0.068	0.252
6	Pure Hydrochlor. of Berberina.		

L. F. Beach.

Leptandrin.—Of the four samples examined, but one gave a good reaction, indicating the presence of alkaloid. One showed traces of lead, and one contained about 18 per cent. of magnesia oxide.

Solubility of the Resinoids, 5 *grams of each sample taken (per cent.).*

Samples.	Residue insoluble in 25 c.c. Water.	Residue insoluble in 10 c.c. Alcohol.	Residue insoluble in 10 c.c. Decinormal solution of Potassa.	Residue insoluble in 10 c.c. Ether.
1	6.2	3.1	4.04	3.74
2	3.66	5.3	6.76	6.32
3	3.8	1.88	1.56	4.34
4	4.48	3.86	2.8	2.32

J. R. Little.

Podophyllin.—In two of the samples examined traces of berberina were found.

Table showing Comparative Solubility by digesting 1 *gram with* 2 *oz. of Water.*

Samples.	1.	2.	3.
Soluble portion, ...	0.060	0.163	0.099
Insoluble portion, ...	0.830	0.698	0.840

Approximate estimation of resinoid in 1 gram by treating with 10 c.c. acidulated water.

Table also showing Samples containing traces of Berberina.

Samples.	Berberina.	Resin.
1	Trace.	0.83
2	None.	0.698
3	Trace.	0.84

L. F. Beach.

Sanguinarin.—In two of the samples examined 6 per cent. of alkaloid was found.

Comparative Table of Solubility, 5 *grams of each Sample taken.*

Samples.	Resinoid insoluble in 25 c.c. Water.	Resinoid insoluble in 10 c.c. Alcohol.	Resinoid insoluble in 10 c.c. Decinormal sol. of Potassa.	Resinoid insoluble in 10 c.c. Ether.
1	6.54	2.8	6.62	3.26
2	6.92	4.1	6.24	6.9
3	7.14	5.89	7.79	6.6

Am. Journ. Pharm., Sept. 1876. J. R. Little.

Solution of Ammonia Acetate.—J. C. Thresh purchased seven samples, of which only two were colorless, and had a neutral reaction. Specific gravity varied between 1.011 and 1.018, percentage of ammonia acetate between 4.6 and 7.9, that of the U. S. P. being about 6 per cent. Am. Journ. Pharm., 1876, p. 318.

Spirit of Nitrous Ether.—George W. Kennedy directs the attention of the profession to the adulterated and worthless article found on the shelves of a majority of the retail pharmacies.

J. U. Lloyd directs the attention to the variety of prices. The specific gravity of four samples were .890, .910, .930, .940; U. S. P. directing it to be .837.

He also speaks of the terms 3 f and 4 f so generally used, expressions not recognized by the "Pharmacopœia," there being no standard work giving light on this subject, they being, according to Mr. Lloyd's version, merely expressions to denote that the one is more diluted with water than the other.

The following is a table of results of the investigations by Mr. Kennedy:

Table of Results of the Investigations of Mr. Kennedy.

Samples.		Spec. Grav.	Per ct. Ethyl. Nitrite.	When treated with Sodium Bicarbonate.	When treated with solution of Potassa for Aldehyd.	Nitrogen Acids as shown by paper previously immersed in Tinct. Guaiac.
1	E. R. Squibb, . . .	0.838	4.6	No effervescence perceptible.	No deposit; light red solution.	Faint blue color produced.
2	Powers & Weightman,	0.84	4.1	Slight effervescence produced.	No deposit; red solution.	A decided blue color.
3	Rosengarten & Sons, .	0.839	4.2	" " "	" "	" "
4	Retail store, ...	0.902	3.2	Effervescence quite active.	Heavy deposit; dark red sol.	Dark blue color.
5	"	0.850	3.5	" slowly.	Slight deposit; red solution.	" "
6	"	0.910	3.1	" briskly.	" "	" "
7	Made in New York, .	0.907	2.9	" "	Heavy deposit; dark solution.	" "
8	Retail store, ...	0.860	3.9	Very slight effervescence perceptible.	No deposit; light solution.	Blue color.
9	"	0.841	4.0	" " "	" "	"
	Made by writer, . .	0.835	4.5	No effervescence.	No deposit; light red solution.	Light blue color.

Samples.	Nitrogen Acids as shown when treated with Sulphate of Iron and Sulphuric Acid.	Ethyl chloride treated with Nitric Acid and Nitrate of Silver.	Action on Litmus Paper.	Color.
1	No change noticeable.	None.	Light red.	Pale yellow.
2	Light olive.	A trace.	Red.	"
3	"	"	"	"
4	Dark olive color.	Light deposit.	Active.	Almost colorless.
5	Pale olive color.	A trace.	"	Light yellow.
6	Dark olive color.	"	"	Very yellow.
7	" "	. . . . .	"	Almost colorless.
8	Light olive color.	A trace.	Light red.	Pale yellow.
9	" "	. . . . .	"	"
10	No change.	. . . . .	"	"

Am. Jour. of Pharm., June, 1876.

Sulphide of Antimony.

Comparative Table of the Composition of Commercial Sulphuret of Antimony, by W. C. Scheffield.

Samples.	Siliceous matter.	Carbon.	Sulphur. of Antimony.	Sulphur. of Arsenic.	Sulphur Iron.	Carbonate of Calcium.	Sulphate of Magnesia.	Total.	Amount taken.	Soda and Potassa.
1	.172	.089	.315	.066	.025	.220	.075	.962	1.000	Trace.
2	.735	.165	None.	.012	.015	.035	.016	.978	1.000	"
3	.675	.125	"	Trace.	.044	.055	.037	.936	1.000	"
4	.070	.347	"	.042	.062	.220	.228	.969	1.000	"
5	.375	.555	"	.012	.023	.011	.009	.985	1.000	"
6	.793	.117	"	None.	.075	None.	None.	.985	1.000	"
7	.090	.456	"	"	.011	.266	.135	.958	1 000	"
8	.775	.200	"	"	.011	None.	None.	.986	1.000	"
9	.338	.284	"	"	.046	.204	.103	.980	1 000	"
10	.143	.606	"	"	.016	.142	.066	.973	1.000	"

University of Michigan.

Sulphur.—According to an essay of C. W. L. Dietrich on precipitated sulphur as found in the market, there is a bad confusion of the terms precipitated and lac sulphur, both articles being sold for one and the same thing, making no distinction between the two terms. There is no official authority for applying the term "milk of sulphur," for the pure precipitated sulphur of the Pharmacopœia.

The term lac sulphur has been adopted in Great Britain for an article obtained by precipitating sulphide of lime with sulphuric acid, and not with muriatic acid as directed in the U. S. P., consequently producing a preparation largely mixed with sulphate of calcium. It is for this mixture the term lac sulphur has been adopted.

Out of eight samples examined, but two were precipitated sulphur; the others were mixtures of precipitated sulphur with sulphate of calcium.

Table showing Results.

Samples.	Sulphur.	Sulphate of Calcium.
1	56.4	43.6
2	74.1	25.9
3	Pure.	. . .
4	"	. . .
5	52.3	47.7
6	52.7	47.3
7	53.8	46.2
8	76.25	23.75

Sulphur.—Milk of sulphur, labelled "Superior English Milk of Sulphur," was found by J. M. France to be a mixture of sulphur and whiting. Pharmacist, 1875, p. 322.

Tincture of Sesquichloride of Iron.—Isaac R. Diller, in examining ten samples of this tincture as found in different pharmacies, obtained the following results :

Samples.	Amount of FerricOxide to 1 fluid ounce.	Anhydrous Hydrochloric Acid to 1 fluid ounce.	Nitric Acid.	Ferrous Oxide.	Precipitate formed on standing.
1	22.6	35.2	Absent.	Absent.	None.
2	27.4	40.3	Present.	"	Slight.
3	28.7	35.7	Absent.	"	None.
4	26.9	33.8	"	"	"
5	28.9	44.8	"	Trace.	"
6	17.5	30.1	"	Considerable.	Slight.
7	32.2	37.	Trace.	Absent.	None.
8	30.7	46.3	"	"	Considerable.
9	27.9	35.4	"	"	None.
10	23.4	34.9	Absent.	"	"

Am. Journ. Pharm., 1876, p. 210.

Valerianate of Quinine.—X. Landerer reports having obtained this salt, exported from France, which upon examination proved to consist of sulphate of cinchonia mixed with oil of valerian and valerianic acid. Am. Journ. Pharm., 1875, p. 533.

MISCELLANEOUS SUBSTANCES.

Ague Mixtures.—The following were examined by O. L. Churchill, with results as stated below.

Ayer's Ague Mixture.—Syrupy liquid, very bitter and slightly peppery, with odor of oil of wintergreen, and ordinary molasses. Alkaloids found in one fluid ounce:

Amorphous Alkaloids (Chinoidin),	3.202
Cinchonia, ...	3.033
Cinchonidia, ...	0.657
Quinia, ...	0.787
Quinidia, ...	1.042
Total, ...	8.722

Retails for $1.00.

Christie's Ague Mixture.—A mixture of sulphate of cinchonia, capsicum, alcohol (about 30 per cent.), cinchona (probably tincture), and common molasses, representing a dark, syrupy liquid, with sediment filling about one-fourth of the bottle, and odor of molasses. Retails for $1.00.

Peterman's Michigan Ague Mixture.—A red, syrupy liquid, with heavy sediment of resinous matter. Containing an alcoholic extract of cinchona bark, but the base of the mixture is chinoidin. Taste and odor reminding of ordinary molasses. Retail price, $1.00.

Wilhoft's Antiperiodic Fever and Ague Cure.—A dark-red, thin liquid. Taste decidedly acid. Composed of compound infusion of cinchona bark with about 20 grains of sulphate of quinine to 4 ounces of liquid and free sulphuric acid. Retail price, $1.50.

Rhode's Fever and Ague Cure.—A mixture presenting a black, muddy appearance, with sediment filling bottle about one-third; this sediment consisted entirely of charcoal. The liquid gave reactions for iron, muriatic acid, glucose, and alcohol. The iron is probably in the form of sesquichloride. Retail price, $1.00.

Am. Journ. Pharm., 1876, p. 391.

Beer.—Picric acid has been employed to give a bitter taste to beer. To detect this adulteration Brunner recommends acidulating the beer with hydrochloric acid, and plunging therein a fragment of woollen thread, and digesting the same in a water-bath. After the thread is removed it is heated with a solution of ammonia. The latter is filtered, evaporated in a water-bath to a small volume, and a few drops of cyanide of potassium are added. The presence of 0.015 grain of picric acid in a pint of beer is determined by a red color being produced, due to the formation of isopurpurate of potassa. Am. Journ. Pharm., 1875, p. 566.

Caucasian Insect Powder.—X. Landerer states that this insect powder is very frequently sophisticated with Anthemis cotula, Chrysanthemum segetum, Matricaria parthenium, and other plants. He also states many other medicinal agents received from Western Europe are likewise adulterated. Am. Journ. Pharm., 1875, 499.

Chocolate.—C. S. Burroughs examined eight samples of chocolate. In one of the samples considerable bean-starch was found, in another the fatty portion was almost entirely animal, there being only enough cacao present to give odor and taste.

Table of Results obtained (per cent.).

Samples.	Amount insoluble in water.	Amount soluble in water.	Fat.	Sugar.	Ash.
1	79.4	20.5	43.	5.5	4.
2	55.3	44.7	19.	41.66	6.
3	68.7	31.3	10.4	2.7	11.
4	32.8	67.1	16.9	25.	2.
5	70.5	29.5	30.75	8.66	13.
6	34.5	65.5	13.4	62.	2.
7	70.	30.	15.	14.7	3.
8	25.9	74.	15.2	48.6	2.

The Br. Soc. Publ. Analysts requires at least 20 per cent. of fat (cacao fat) in cocoa.

Coffee.—Five samples ground coffee put up in packages, analyzed by C. H. Eddy, gave the following results:

Samples.	Chicory approxim.	Other additions.	Total Starch.	Coffee.
1. Pure Mocha and Java	22 per ct.	. . . . . .	. . . . .	Found.
2. Pure Rio, ...	24 "	. . . . . .	. . . . .	"
3. Centennial Prize, .	22 "	Oats and peas.	9 per ct	No caffeina.
4. Royal Java, . . .	31 "	" "	5 "	" "
5. Gov't Java, war'antd	38 "	Carrots and peas.	2 "	" "

Copaiva Balsam in Capsules.—The "Pharmaceutische Zeitung" states that capsules of balsam of copaiva were recently offered to a druggist at such a price that he was forced to suspect the purity of the article. On examination it was found that the inclosed fluid, although of good appearance, color, and consistency, when evaporated at 110–120° C., left a residue which was clear while hot, and thick, oily, and turbid when cold. Finally heated over 200° C. vapors were evolved which were distinctly recognized as those of acrolein. Pharmacist, 1876, p. 26.

COSMETICS AND ENAMELS, BY EDWARD J. RISSER.

Cascarilla de Caracol de Persia.—H. Tetlow. Composed of chalk and white earth.

Creme Delis.—E. W. Lightner & Co., Detroit. Consists of a colorless liquid holding in suspension bismuth subcarbonate.

Hagan's Magnolia Balm.—Lyons Manufacturing Company, New York. Colorless liquid, with oxide of zinc stained with carmine.

George Joseph Mitch gives the composition for one bottle as follows: Zinc carbonate, 262 grains; glycerin, 2 drachms; carmine, sufficient to give color. Am. Journ. Pharm., 1876, p. 300.

Laird's Bloom of Youth.—George W. Laird. Colorless liquid holding in suspension zinc oxide, bismuth subcarbonate, and chalk.

George Joseph Mitch gives the following as composition of one bottle:

31.20 grains of Oxychloride of Bismuth.
129.80 grains of Carbonate of Zinc.
50.00 grains of Carbonate of Calcium.

Total, 211.00 grains. Actual weight, 212 grains.

Am. Journ. Pharm., 1876, p. 301.

Magnolia Tablet.—R. and G. A. Wright. Composed of starch, chalk, magnesium carbonate, and siliceous matter, as French chalk or white earth.

Meen Fun.—R. M. Hobbs. Is a good article of white earth.

Mother of Pearl.—R. D. Young, New York. Composed of chalk, magnesium carbonate, siliceous matter, either French chalk or white earth.

Niourine.—F. Stearns, Detroit. Colorless, with subnitrate of bismuth in suspension.

Palmer's Invisible.—Solon Palmer. The bulk of this preparation is white earth mixed with chalk stained with carmine.

Royal Spanish Lily White.—Hawkes & Co., London. Composed of chalk, magnesium carbonate, and siliceous matter, either French chalk or white earth.

Superior Lily White.—W. E. Kidder & Co. Same as the one just mentioned.

Venetian Rouge.—Same as the Lily White, and stained with carmine.

Disinfectants.—Some chloride of soda solutions, as found in the retail establishments, were analyzed by J. Coughlin. In a sample of Labarraque's solution but 1.57 per cent. of available chlorine was found, and in a sample of Powers & Weightman's 1.27 per cent.

The blame for this inferiority is probably to be traced to the retailer rather than to the manufacturer, owing to carelessness in management or ignorance of the deteriorating influence of exposure and light.

Laroche's Ferruginous Cinchona Wine, examined by Wittstein, was found to contain neither quinia, cinchonia, nor iron, but was merely an alcoholic tincture of orange berries sweetened with sugar. Am. Journ. Pharm., 1876, p. 328.

Liniments.—The following is the result of an analysis of six different nostrums, as found in the market, by J. J. Pierron:

Chamberlain's Relief.

The approximate proportions are

Tct. of Capsicum,	℥1.
Spts. of Camphor,	ʒ6.
Gum Guaiac,	ʒ2.

Some colored tincture (probably red Saunders) to make 2 fluid ounces.

Retails for 35 cts.

Flagg's Relief. Approximate Formula.

Oil of Cloves,	ʒ1.
Oil of Sassafras,	ʒ2.
Spts. of Camphor,	℥1½.
Coloring matter.	

Retails for 50 cts.

Hamlin's Wizard Oil.

Spts. of Camphor,	℥½.
Water of Ammonia,	℥¼.
Oil of Sassafras,	℥¼.
Oil of Cloves,	ʒ1.
Chloroform,	ʒ2.
Spts. of Turpentine,	ʒ2.
Alcohol, dilute,	ʒ3.

Retails for 50 cts.

Kellogg's Red Drops.

Spts. of Camphor,	℥2.
Spts. of Turpentine,	℥½.
Oil of Origanum (commercial),	℥¼.
Oil of Sassafras,	℥¼.
Red coloring matter.	

Perry Davis's Pain Killer.

Spts. of Camphor,	℥2.
Tct. of Capsicum,	℥1.
Gum Myrrh,	℥¼.
Gum Guaiac,	℥½.
Alcohol,	℥3.
Coloring matter.	

Retails for $1.00.

Radway's Ready Relief.

Soap Liniment,	℥1½.
Tct. of Capsicum,	℥½.
Water of Ammonia,	℥½.
Alcohol,	℥½.

Retails for 50 cts.

Dr. Radcliffe's great remedy, *Seven Seals* or *Golden Wonder*, is composed of the following, according to Hager: Alcoholic extract of capsicum, ether, chloroform, oil of peppermint, and camphor. E. Jacobsen's Chemisch-Technisches Repertorium, 1874, ii, p. 291.

Sherry Wine.—J. B. Francis states that dishonest shippers in Cadiz had lent themselves to the frauds of London wine merchants, who, according to wine circulars, obtained the cheapest liquid trash they could find to make a counterfeit, which they shipped to Cadiz, to be brought back as genuine sherry, with a bill of lading from that port. Pharmacist, 1875, p. 339.

Tea.—Fifteen specimens of tea, analyzed by J. T. Clark, gave the following results:

Name.	Price per lb.	Extract soluble in water.	Tannin.	Total Ash.	Ash soluble in water.
1. Japan, ...	0 65	35.5	19.	5.6	3.4
2. Young Hyson, . .	0 80	39 8	12.4	5.0	2.4
3. Japan, ...	0.90	41.8	9.5	6.3	3.9
4. Black, ...	0.90	44.5	10.6	5.5	. . .
5. Young Hyson, . .	0.75	37.2	16.	6.7	. . .
6. " " . .	1.00	45.0	20.1	7.1	3.5
7. " " . .	0.85	44.9	17.5	5.7	. . .
8. Japan, ...	0.90	35.7	14.6	6.1	. . .
9. Oolong, ...	0.40	29.4	8.0	6.7	1.7
10. English Breakfast,	1.00	21.2	5.6	5.2	1.3
11. Japan Siftings, . .	0.50	39.7	10.1	7.6	. . .
12. Japan, ...	0.40	23.4	7.6	4.8	0.9
13. Young Hyson, . .	0.40	36.9	12.3	6.7	. . .
14. American Tea Co.,	. . .	41.5	16.7	5.6	. . .
15. Oolong, ...	. . .	39.6	8.9	6.4	. . .

Tea shall contain not more than 8 per cent. mineral matter (calculated on the tea dried at 100° C.), of which at least 3 per cent. shall be soluble in water, and the tea as sold shall yield at least 30 per cent. of water extract. Soc. Publ. Analysts Great Britain. No. 9 was largely adulterated with foreign leaves. No. 10 and 12 had a disagreeable odor, and suspected by the author to contain spent tea.

OTTMAR EBERBACH,
JOSEPH P. REMINGTON,
LOUIS DOHME,
Committee.

REPORT OF THE COMMITTEE ON METRIC WEIGHTS AND MEASURES.

In the course of about eighty years the metric system of weights, measures, and coins has become the standard of more than half of the civilized nations, and its universal adoption appears to be only a question of time in overcoming habit and prejudice. The perplexing multiplicity of units in weights and measures still prevailing in the United States will soon have to give way to the fixed and uniform standard of the metric system. Its simplicity and superior advantages recommend it above all others.

This subject has been before the American public for years,* and with increasing urgency towards reform, and most of the learned associations have advocated the abandonment of our present system, or rather want of system, in weights and measures, and the adoption of the metric standard instead. Among these the American Association for the Advancement of Science, the American Medical Association, and the National Associations of Architects, of Civil and Mining Engineers, and of Railroad Master Mechanics take a prominent rank, and their aims and efforts, when combined in concerted action, will largely contribute to inaugurate an early realization of the desired reform. The opportunity and time for such action has arrived, as the subject is now before Congress, which has been memorialized, in December, 1875, by a petition of the American Association for the Advancement of Science. This petition in favor of a speedy adoption of the metric standard throughout the United States, authorized by the International Bureau of Weights and Measures, bearing the signatures of over eleven hundred of the leading minds in all professions and classes, and representing twenty different States, will come up among the unfinished business of Congress early after its reassembling in December next.

It would be out of place to comment now and here on the origin, rise, nature, and value of the metric system, to point to its recog-

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* Report on Weights and Measures, by John Quincy Adams, Secretary of State, 1821. House Docum., No. 109; 16th Congress, 2d session.

Report of the Secretary of the Treasury, on the Construction and Distribution of Weights and Measures, 1857. Senate Exec. Docum., No. 27; 34th Congress, 3d session.

nized advantages and its comparatively insignificant defects, for its value has long since been demonstrated beyond the need of argument; it is taught to the youth of the land in our common schools and colleges, and is therefore familiar to all educated persons. Only the means of the popularization of its use among the people, and the most expedient methods for its introduction and universal use in the transactions of trades, commerce, and every-day life, admit of discussion and invite suggestions.

The adoption of such a reform, affecting so large a proportion of the most common transactions in all classes of business and of every-day life, cannot well take place at short notice, nor can its introduction be initiated by the one or other profession or trade independently; such a movement must be conducted deliberately and by degrees, and ought to be based upon concerted action throughout the land.

As regards pharmacy, the sphere of the pharmacist does not offer substantial chances to take initiative steps or to lead in such a movement; he cannot, in his purchases, force the use of metric weights and measures upon the original packages of the chemical and pharmaceutical manufacturer, nor employ them independently in his retail sales. All the pharmacist can do, individually, is to make himself and his assistants more and more familiar with and used to every detail of the metric system, its relations with our present weights and measures, to advance the dissemination of such knowledge, and to advocate the early inauguration of such a reform.

In consideration of the fact that this subject is now before Congress, and has engaged the interest and efforts of many of the learned and other kindred associations of our country, your committee, impressed with the importance of concerted action in this matter, deem it advisable, provided the American Pharmaceutical Association approve of its arguments, that the Association early during its present meeting, elect a permanent committee of three with this instruction and authority:

1. To represent and advocate the sentiments and aims of the American Pharmaceutical Association, in favor of an early and concerted action for the compulsory introduction of the metric standard for weights and measures in the United States.

2. To either invite co-operation or act in conjunction with committees or authorized representatives of kindred associations and

the government, for well-devised and definite steps towards the speedy realization of such a reform.

3. To request authors of reports and papers brought before the Association to employ metric units, or else to add to statements of weights and measures, their metric equivalents; as also to commend the metric system to be taught and included among the subject-matter of examination for admission as well as for graduation, in all those schools of pharmacy connected with the American Pharmaceutical Association.

This course would greatly aid in familiarizing the metric system, and in gradually introducing the same into American pharmaceutical literature, and perhaps also into our pharmaceutical and manufacturing laboratories.

4. To consult with and urge upon chemical and pharmaceutical manufacturers the propriety of joining the American Pharmaceutical and kindred associations in their efforts for a reform of our present weights and measures, and to solicit them to add metric equivalents to the present amount of weights on the labels of their original packages and vials; and to adopt, at their earliest convenience, a change in the amount of their products put up and sold in small original packages or vials, using metric instead of avoirdupois weights. This change would not necessarily require an alteration in the size of vials now in common use.

In regard to the formulas of pharmacopœias, your committee deem it opportune and proper to state, that it indorses and recommends the method now widely accepted in the most advanced pharmacopœias, to employ parts by weight only, which method has the additional advantage of at once being adjustable to any system and proportion of weights.

In view of the growing public sentiment in favor of reform, and of the strenuous efforts of most of the learned associations of the country, your committee share the opinion expressed in the "Report of the Committee of the American Society of Civil Engineers on the Metric System of Weights and Measures,"* that all what remains to be done, in order to initiate such a reform, is that only the signal is wanted for a simultaneous movement, and that this should come from the government, by its fixing some future date, when the present system of weights and measures shall be abandoned, and metric standards be established as the law of the land.

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* Published in Boston, December 14th, 1875.

To this end all interested and influential bodies, by their committees or representatives, should jointly appeal to Congress early at its next session in December, for compulsory legislation taking effect at a fixed future day, while they, in the meantime and during the preparatory years, should pre-eminently be instrumental in the advancement and dissemination of instruction and knowledge, in regard to the details and use of the metric system among all classes of the community so as to effectually prepare the way for its final general adoption.

That the apparently numerous and great difficulties in the way of such a reform can readily be surmounted has recently been proved by the successful experiment of the German Empire. Quoting from the report of the above-mentioned committee, "It is certainly a most encouraging fact that a country so densely populated, standing so high in the scale of civilization and culture, and having all the arts, manufacture, and commerce so fully developed, should have been able, in the space of four years, to effect the adoption, in all the affairs of life, of a new system of weights and measures. The movement was begun there also by learned bodies, who passed votes, and petitioned the government to have some uniform and sensible system of weights and measures made the only legal standard of the country. This resulted in the appointment of an expert commission, which reported in favor of the metric system, and recommended immediate legislation. Accordingly, in 1868, the government passed a law which made metric weights and measures the only legal standard from and after January 1st, 1872. The expert commission was kept in existence, and made to superintend the many preparatory details of the change. During the four preparatory years great activity prevailed throughout the land, so that on January 1st, 1872, there was but little left to be done. The principal changes had already been gradually effected, and the great revolutionary change was accomplished with none, or but very little disturbance to business."

In conclusion, your committee beg to recommend from among the large number of publications and reports on the metric system and its introduction, the following papers of value for information and reference:

1. Maass-und Gewichts-Ordnung vom 17 August, 1868, nebst der Eich-Ordnung vom 16 Juli, 1868. Von G. M. Kletke. Berlin, 1871.

2. The Metric System of Weights and Measures. By President F. A. P. Barnard. New York, 1872.

3. The Metric System of Weights and Measures. By J. P. Putnam. New York, 1874.

4. Report of the Committee on Weights, Measures, and Coinage to the American Association for the Advancement of Science. Detroit Meeting, 1875.

5. Report of the Committee on the Metric System of Weights and Measures to the American Society of Civil Engineers. Boston Meeting, 1875.

6. The Decimal System. By B. F. Craig. Van Nostrand. New York.

7. Weights, Measures, and Money of all Nations. By Prof. F. W. Clarke. D. Appleton & Co. New York, 1875.

8. The Universal Metric System. By Alfred Colin. D. Appleton & Co. 1876.

9. Report of the Committee of the American Association for the Advancement of Science on Uniform Standards in Weights, Measures, and Coinage. Buffalo Meeting. 1876.

10. The Use of Metric Weights in Prescriptions. By Prof. J. M. Maisch, in "Medical and Surgical Reporter." September 9th, 1876.

11. The Metric System of Weights and Measures. By Dr. E. R. Squibb. A paper read before the Philadelphia Meeting of the International Medical Congress. September, 1876.

Respectfully submitted,

FRED. HOFFMANN,
S. P. SHARPLES,
T. S. WIEGAND,
Committee.

As a member of the committee which has just reported on the metric system of weights and measures, I feel it is due, both to myself and the Association, to state my reasons for signing the report, so that my action may not be understood as recommending the immediate adoption of the system, or even expressing the opinion that the system is the best one for popular use in our country. Any coercive legislation upon matters that have by long custom become as familiar as the avoirdupois weight, and the inch and foot measure in daily use, will be met by a stubborn opposition.

While the metric system possesses the great advantage of being readily changed from linear measure to that of capacity, it is not in practice any more useful to the artisan in his daily toil, or the dealer in his trading, on that account than any other system; he never has that matter to do; his weights and measures are already provided for him by those whose business it is to make and sell them, and whether he buys the metric or any other set of weights and measures is a matter of indifference to him. To the scientific mechanician, who is desirous of making a set of measures, such a ready convertibility as that pertaining to the metric system may be, and doubtless is, a matter of considerable moment, and to the educated of all classes the decimal system of notation is a very great convenience, while its nomenclature tells the value of each specific part at once. To those uneducated in the scientific terms of metrology this very advantage becomes a source of perplexity, and even error; their mind, eye, and ear are not educated to the distinction involved between deci and deca; there would be a constant trouble arising from the misunderstanding, and many a time decagram of an article would be purchased where one-hundredth of the quantity was really the amount desired.

The entire system of treatises in use among artisans would have to be reproduced, with the measures of all kinds reduced to the metric system, and this often at a cost far beyond the value of the entire demands for the works, and thus, of course, preventing its accomplishment. Another great objection lies in the fact of the impossibility of continual bisection of the metric unit, a process which the natural tendency of the trading community leads to, and to which the originators of the metric system acceded to when the half kilogram was directed to be made, so as to approach nearly in weight to the pound then in use; and yet the difference being over ten per cent., it would enhance the selling price just so much, and render the purchaser, who could not understand the difference between the substitute and the old pound-weight, dissatisfied with the new system. Having thus succinctly stated the objections, I respectfully ask that this paper may be printed in immediate sequence of the report last read, that the opinion of the committee may fully appear in proper connection.

THOMAS S. WIEGAND.

REPORT OF THE COMMITTEE ON LEGISLATION.

During the past year, this committee have been called upon for advice in but few cases, and have to report not a single State of our Union as being added to the list of those where the practice of pharmacy is legally restricted; but in three States very important modifications of previously existing laws have been passed since the last meeting. One of these amending laws applies to the Pharmacy Act of the city of Baltimore, which was published in the Proceedings for 1872, page 153. The amendment permits the unrestricted sale of all *patent and proprietary medicines*, of all *non-poisonous drugs*, and of all *compounds in the original packages or bottles*, *put up by wholesale druggists*. Particularly the latter provision is objectionable, since, according to the letter of the law, no restriction is placed upon the sale of *poisonous compounds* by persons unacquainted with their deleterious properties, if such compounds have only been put up by wholesale dealers in drugs and medicines. The evident aim of the Baltimore Pharmacy Act is to restrict the compounding of prescriptions and the dealing in dangerous drugs and chemicals to persons properly educated to their calling, and fully conversant with the properties of poisons, be they crude drugs, chemicals, or compound preparations; to some extent this aim is nullified by the new act, and no adequate precautionary measures or regulations have been imposed.

The remaining sections are improvements upon the old law. Now, for the benefit of the heirs, the business of a deceased pharmacist must be carried on under the control and management of a registered pharmacist, while the old law gave the legal representative six months' time before they were required to procure the services of a competent person. A section has likewise been added for the regulation of the compounding of prescriptions by apprentices, who are now required to be instructed in that duty by a service of at least two years under the supervision of a pharmacist, and by an attendance upon at least one course of lectures on Pharmacy, Chemistry, and Materia Medica. Another section provides for the punishment of fraudulent adulterations of *officinal* medicines. The two sections referred to have evidently been framed from sections 8 and 10 of the Philadelphia Pharmacy Act, but the latter is much more comprehensive in aiming at the prevention of fraudulent adulterations of *any drug or medicinal sub-*

stance, or any preparation authorized or recognized by the Pharmacopœia of the United States, or used or intended to be used in medical practice (Proceedings, 1872, p. 158). It cannot, of course, be intended to prohibit merely the adulteration of the medicines found in the officines or apothecaries' stores, and permit this nefarious practice to be carried on in the shops of the general dealer.

The pharmacists in South Carolina were heretofore qualified by either one of the faculties of two medical colleges. We are pleased to record the organization and incorporation of the Pharmaceutical Association of the State of South Carolina, upon whom the duty of examining and licensing pharmacists in that State hereafter mainly devolves. A kind of compromise with the former powers seems to have been necessary, for the two boards of pharmaceutical examiners are each constituted of four pharmacists elected by the Association, and two persons appointed by one of the medical faculties. One-half of the fees go to the medical colleges, the other half to the Pharmaceutical Association. An unwise provision, which is also contained in a few other pharmacy laws, and which has been repeatedly criticized in former reports of this committee, permits the registration or licensing as pharmacists of graduates in medicine, without requiring of them any pharmaceutical education or experience. The list of poisons which require, when sold, to be marked as such, and with a label giving at least one antidote, is rather limited; but the Pharmaceutical Association has the power to amend and increase this list.

A pharmacy law, amending the law of 1872 (see Proceedings, 1872, p. 158), has also been passed in California, applying to the city and county of San Francisco. The Board of Pharmacy, which at present consists of Messrs. John Calvert, President; William T. Wenzell, Secretary; Max Tschirner, James H. Widber, and A. F. Colman, is triennially appointed by the San Francisco members of the California Pharmaceutical Society. Graduates in pharmacy are registered as pharmacists upon application; also those in business on their own account at the time of the passage of the act; all others, including assistants of not less than three years' experience, must submit to an examination. The law contains also provisions for regulating the sale of poisons and for the punishment for adulterating medicinal articles.

Copies of the three laws are attached to this report; also the copy of a law passed by the State of Missouri, March, 1875, and modelled after a law enacted in New York. It relates among others to certain preparations which are directly or indirectly recommended for criminal purposes.

In concluding this report, it is respectfully urged upon the various pharmaceutical examining boards that they communicate to the future Committees on Legislation their annual reports; it is very likely that valuable statistical information might be computed from them. The committee are already indebted to several boards for this courtesy. Respectfully submitted,

JOHN M. MAISCH,
Chairman of Committee.

AMENDED PHARMACY LAW OF BALTIMORE, MD.

[CHAPTER 91.]

AN ACT *to repeal and re-enact sections two and nine of an act passed at January session, eighteen hundred and seventy-two, chapter four hundred and fourteen, entitled "An act to prevent incompetent persons from conducting business as pharmacist or vending at retail drugs, medicines or chemicals for medicinal use in the city of Baltimore," and repealing the act, entitled "An act to prevent incompetent persons from conducting the business of druggist or apothecary in the city of Baltimore," passed January session, eighteen hundred and seventy, chapter one hundred and four, and add two new sections thereto.*

SECTION 1. Be it enacted by the General Assembly of Maryland, That sections two and nine of an act, entitled "An act to prevent incompetent persons from conducting business as pharmacist, or vending at retail drugs, medicines or chemicals for medicinal use in the city of Baltimore," and repealing an act, entitled "An act to prevent incompetent persons from conducting the business of druggist or apothecary in the city of Baltimore," passed January session, eighteen hundred and seventy-two, chapter four hundred and fourteen, be and the same are hereby repealed and re-enacted so as to read as follows, viz., and to add new sections thereto numbered section 9 A and section 9 B.

SEC. 2. And be it enacted, That any person who, after the passage of this act, does and shall vend at retail poisonous drugs for medicinal use, or compound or dispense physicians' prescriptions in the city of Baltimore, without complying with the requirements of this act, shall be deemed guilty of a misdemeanor, and subject to a penalty or fine of fifty dollars for each and every week he shall continue to vend at retail poisonous drugs for medicinal use, or compound and dispense physicians' prescriptions in violation of this act; said penalty or fine to be sued for in the name of the commissioners of pharmacy and practical chemistry appointed under this act, before a single justice of the peace, as small debts are now recoverable, one-half thereof to be paid to the board of public school commissioners of said city for the use of the public schools, and the other half to the treasurer of the Maryland College of Pharmacy for the use of said college; provided, however, that this act shall not be so construed as to apply to or restrict the sale at retail of patent and proprietary medicines and compounds prepared and compounded for medicinal use by wholesale dealers in drugs and medicines when sold in the original package, box or bottle, and no penalty shall hereafter be enforced against any person for the sale of patent or proprietary medicines or compounds prepared by wholesale dealers in drugs and medicines when sold as aforesaid, and no penalty shall hereafter be enforced against any person for the sale of proprietary or patent medicines or drugs other than poisonous.

SEC. 9. And be it enacted, That in case of the death of a registered pharmacist doing business in the city of Baltimore that his legal representatives may continue said business for the benefit of the estate of said deceased, under the control and management of a registered pharmacist, subject to all the requirements of this act.

SEC. 9 A. And be it enacted, That no person, unless he be registered as a pharmacist under this act, or unless he be an apprentice who has had at least two years' experience under a pharmacist, who has attended at least one full course of lectures on Pharmacy, Chemistry, and Materia Medica, shall be permitted to compound and dispense the prescriptions, except as an aid under the supervision of a registered pharmacist. Any registered pharmacist violating this section, or permitting its violation in any store under his charge or management, shall be subject to a penalty or fine of fifty dollars, the one-half thereof to be paid to the board of public school commissioners of said city for the use of the public schools, and the other half to the treasurer of the Maryland College of Pharmacy for the use of the college.

SEC. 9 B. And be it enacted, That any person who shall mix with any substance or preparation used or intended to be used as an officinal medicine, any foreign or inert substance for the purpose of adulterating or weakening the same, or shall knowingly sell or knowingly offer for sale any officinal medicines so adulterated or deficient in standard strength, shall be deemed guilty of misdemeanor, and subject to a penalty or fine of fifty dollars, as provided in the preceding section.

SEC. 2. And be it enacted, That this act shall take effect from the date of its passage.

We hereby certify that the aforegoing chapter 91 is a correct copy of an Act of Assembly passed January session, 1876.

Approved March 16th, 1876.

MILTON Y. KIDD,
Chief Clerk of the House of Delegates.
AUGUSTUS GASSAWAY,
Secretary of the Senate.

PHARMACY LAW OF SAN FRANCISCO, CALIFORNIA.

AN ACT *to amend an act entitled An Act to Regulate the Practice of Pharmacy in the City and County of San Francisco, passed March twenty-eighth, A.D. eighteen hundred and seventy-two.*

The People of the State of California, represented in Senate and Assembly, do enact as follows:

SECTION 1. From and after the first day of June, A.D. eighteen hundred and seventy-six, it shall be unlawful for any person within the city and county of San Francisco to open or conduct any pharmacy or store for retailing, dispensing, or compounding medicines or poisons, unless such person be a registered pharmacist, within the meaning of this act; and it shall be unlawful for any person within the city and county of San Francisco to compound and sell at retail any medicines or poisons, or to compound or dispense any physician's prescription, unless such person be a registered pharmacist or a registered assistant pharmacist, within the meaning of this act, except as hereinafter provided.

SEC. 2. Any person, in order to be a registered pharmacist, must be a graduate in pharmacy, a licentiate in pharmacy, or a practicing pharmacist.

SEC. 3. Graduates in pharmacy are persons who have had four years' experience in stores where prescriptions of medical practitioners are compounded, and each must have obtained a diploma from a college of pharmacy within the United States, or from an authorized foreign institution or examining board. Licentiates in pharmacy are persons who have had four years' experience in stores where prescriptions of medical practitioners are compounded, and shall have passed an examination before the Board of Pharmacy; or pharmacists who shall present satisfactory credentials or certificates of their attainments to the Board of Pharmacy. Practicing pharmacists are such persons only who, at or prior to the passage of this act, have kept and continue to keep pharmacies in the city and county of San Francisco, for compounding and dispensing the prescriptions of medical practitioners, and for the sale of medicines and poisons. Registered assistants in pharmacy are persons of not less than eighteen years of age, who are employed by registered pharmacists, and have studied the art of pharmacy for three years, and have furnished satisfactory evidence of the same to the Board of Pharmacy, and have been registered as assistant pharmacists as hereinafter provided.

SEC. 4. The members of the California Pharmaceutical Society residing in San Francisco shall, during the month of May, eighteen hundred and seventy-two, and every third year thereafter, during the month of May, elect five of the most competent pharmacists of San Francisco to serve as a Board of Pharmacy. The members of this board shall, within thirty days after their appointment, individually take and subscribe before the county clerk an oath, faithfully and impartially to discharge the duties prescribed by this act. They shall hold office for the term of three years, and until their successors are appointed and qualified; and in each case of vacancy the said Board of Examiners shall elect from three nominees selected at a meeting of the said society. The board shall organize for the transaction of business in the city of San Francisco by the election, for the whole term, of president and secretary. Three members of the board shall constitute a quorum. They shall meet at least quarterly, and have power to make by-laws for the proper fulfilment of their duties. The duties of this board shall be to transact all business pertaining to the legal regulations of the practice of pharmacy and the retailing of poisons, and to examine and register as pharmacists, or assistant pharmacists, all applicants whom it shall deem qualified to be such, respectively. All persons applying for examination shall pay to the secretary a fee of five dollars; and on passing the examination shall be furnished with a certificate signed by the president and examiners.

SEC. 5. It shall be the duty of the secretary to keep a book of registration open at some convenient place, of which due notice shall be given through the public press, in which shall be entered, under the supervision of the board, the names, titles, qualifications, and places of business of all persons coming under the provisions of this act; and it shall be the duty of all such persons to appear before the board or its secretary, within a period of thirty days after its organization, and be registered. The fee for the first registration of graduates, licentiates, and practicing pharmacists, shall be two dollars; for assistants, one dollar. It shall be the duty of every person registered to have his registration renewed every year, in the month of January, the fee for which shall be one dollar; and upon changing his place of business, or engagement, to notify the secretary within thirty days. The secretary shall make all necessary alterations in the register, and notify all persons, on or before the tenth day of February, who shall not have renewed their registration, for which notification the secretary shall receive a fee of fifty cents; and in case no answer is received within fourteen days, such name shall be erased unless an excuse satisfactory to the board be presented; *provided, always*, that the said name shall be restored on payment of fifty dollars to the secretary of the board within one year. The secretary shall give receipts for all moneys received by him, and pay said moneys to the treasurer of the California Pharmaceutical Society, taking his receipt therefor. The salary of the Board of Pharmacy and of the secretary shall be fixed by the Board of Directors of the California Pharmaceutical Society, to be paid out of the registration fees and fines.

SEC. 6. From and after the first day of June, eighteen hundred and seventy-six, every registered pharmacist who shall knowingly, intentionally, and fraudulently adulterate, or cause to be adulterated, any drugs, chemicals, or medicinal preparation, shall be held guilty of a misdemeanor, and on conviction shall be fined fifty dollars in the first, one hundred dollars in the second, and on conviction in the third case, his name shall be erased from the register.

SEC. 7. And be it further enacted, That on and after the first day of June, eighteen hundred and seventy-six, it shall be unlawful for any person in the city and county of San Francisco to retail any poisons enumerated in schedules "A" and "B," appended to this act, without distinctly labelling the bottle, box, vessel, or paper, and wrapper or cover in which said poison is contained, with the name of the article, the word "Poison," and the name and place of business of the seller. Nor shall it be lawful for any person to sell or deliver any poison enumerated in schedules "A" and "B" to any person, unless, on due inquiry, it is found that the person is aware of its poisonous character; and that it is to be used for a legitimate purpose. Nor shall it be lawful for any person to sell or deliver any poison included in schedule "A" without, before delivering to the buyer, making, or causing to be made, an entry in a book kept for that purpose only, stating the date of sale, the name and address of the purchaser, the name and quantity of the poison sold, the purpose for which it is stated by the purchaser to be required, and the name of the dispenser; said book to be always open for inspection by the proper authorities, and to be preserved for at least five years. The provisions of this section shall not apply to the dispensing of poisons (in not unusual doses or quantities) upon the prescriptions of practitioners of medicine.

SEC. 8. Any person who shall attempt to procure registration for himself or for any other person, under this act, by making, or causing to be made, any false representations, shall be deemed guilty of a misdemeanor, and shall, upon conviction thereof, be fined in a sum not exceeding five hundred dollars. Any registered pharmacist who shall permit the compounding and dispensing of prescriptions of medical practitioners in his store by persons not registered, except by junior assistants under the direct supervision of registered persons; or any person not registered who shall retail or dispense medicines or poisons, except in a pharmacy, under the supervision of a registered pharmacist or a registered assistant pharmacist, or who shall fraudulently represent himself to be registered, and any registered person who shall fail to comply with the regulations of this act, in regard to the retailing and dispensing of poisons, shall, for every such offence, be deemed guilty of a misdemeanor, and on conviction thereof be fined not exceeding five hundred dollars.

SEC. 9. One-half of all fines imposed for violations of this act shall be paid to the secretary of said board, and it shall be the duty of said secretary, after paying all the necessary expenses of said board, to pay over any surplus money to the treasurer of the California Pharmaceutical Society.

SEC. 10. All persons registered under this act shall be exempt and free from all jury duty in the city and county of San Francisco.

SEC. 11. All acts and parts of acts in conflict with the provisions of this act, in so far as they so conflict, are hereby repealed.

SCHEDULE A.

Arsenic and its preparations, corrosive sublimate, white precipitate, red precipitate, biniodide of mercury, cyanide of potassium, hydrocyanic acid, strychnia, and all other poisonous vegetable alkaloids and other salts; essential oil of bitter almonds; opium and its preparations, except paregoric and other preparations of opium containing less than two grains to the ounce.

SCHEDULE B.

Aconite, belladonna, colchicum, conium, nux vomica, henbane, savin, ergot, cotton root, cantharides, digitalis, and their pharmaceutical preparations; croton oil; chloroform, chloral hydrate, sulphate of zinc, sugar of lead, mineral acids, carbolic acid, and oxalic acid.

Passed by the State Legislature, Session 1876.

LAW OF MISSOURI AGAINST ARTICLES OF IMMORAL USE.

AN ACT *for the suppression of Publication, Trade in and Circulation of Obscene Literature and Pictures, and the Manufacture of and Dealing in Articles of Immoral Use.*

Be it enacted by the General Assembly of the State of Missouri as follows:

SECTION 1. No one shall manufacture, buy, print, publish, or in any way come in possession of or sell or give away or otherwise distribute or circulate any obscene, lewd or licentious book, pamphlet, picture, paper, print, or other publication, or any article or thing designed or intended for the prevention of conception or procuring of abortion, nor any article or thing intended or adapted for any indecent or immoral use or nature, or any written or printed card, circular, book, pamphlet, advertisement or notice of any kind whatever, stating when, where, how or of whom, or by what means any of the articles or things in this section hereinbefore mentioned, can be purchased or obtained; and any one being guilty of any of the offences mentioned in this section shall, on conviction thereof, be imprisoned in the county jail for not less than three months nor more than two years, or fined not less than one hundred dollars, nor more than five thousand dollars, for each offence.

SEC. 2. All articles or raw materials found in the possession of any person or persons intending to sell or manufacture the same into the articles described in the first section of this act, and all tools, machinery, implements, instruments, and personal property used in the manufacture of the articles described in the first section of this act or intended to be so used, may be seized, forfeited, and destroyed.

SEC. 3. Any justice of the peace is authorized upon complaint of any person supported by his oath or affirmation that he believes or has good cause to believe that any of the articles mentioned in this act, particularly describing the same, are in the possession of any person or persons, or concealed in or upon the premises, particularly describing the same, of any person or persons, whether for sale or manufacture, or for distributing, shall issue to any constable, marshal or public officer within said county a warrant of search and arrest, directing such officer to search and seize any and all the articles and property described in said complaint, and arresting any and all persons having said property in their possession, and if upon inspection said articles and property shall be embraced within the articles and property described in the first section of this act, he shall condemn and forfeit the same to be destroyed by the said constable or officer making such seizure, in his presence, and if any person or persons having said property in his possession or control as the owner thereof, or for the purpose of sale or manufacture, or for distribution, shall be arrested, and found guilty thereof, he shall be fined or imprisoned, as provided in the first section of this act.

SEC. 4. This act shall take effect and be in force from and after its passage.

Approved March 12th, 1875.

PHARMACY LAW OF SOUTH CAROLINA.

AN ACT *to incorporate the Pharmaceutical Association of the State of South Carolina.*

SECTION 1. Be it enacted by the Senate and House of Representatives of the State of South Carolina, now met and sitting in General Assembly, and by the authority of the same: That G. J. Luhn, G. W. Aimar, C. F. Panknin, A. W. Eckel, B. F. Moise, E. S. Burnham, A. H. Schwacke, C. O. Michaelis,

A. O. Barbot, E. H. Heinitsh, A. H. Davega, W. C. Fisher, A. E. Norman, W. C McMillan, H. E. Heinitsh, W. A. Gibson, W. H. Harbers, H. Baer, and their associates and successors, are hereby made and created a body politic and corporate, under the name and style of "The Pharmaceutical Association of the State of South Carolina."

SEC. 2. That the said corporation hereby created and established shall have succession of officers and members according to its by-laws, and shall have power to make by-laws not repugnant to the laws of the land, and to have, use. and keep a common seal, and the same to alter at will; to sue and be sued in any court in this State, and to have and enjoy every right, power, and privilege incident to such corporation; and it is hereby empowered to take, hold, retain, possess and enjoy all such property, real and personal, as may be given, bequeathed, or devised to it, or may be acquired by the said corporation by purchase, or in any other manner whatsoever: provided the amount so held shall not exceed the sum of twenty-five thousand dollars ($25,000), and to sell, alien, or transfer the same or any part thereof.

SEC. 3. That the Association hereby incorporated shall elect annually four members, who, with two (2) other persons to be appointed by the Medical College of the State of South Carolina, shall constitute a Board of Pharmaceutical Examiners for the city of Charleston, to hold office for the term of one (1) year. And the said Association shall elect annually four (4) members, who, with two (2) other persons to be appointed by the medical faculty of the University of South Carolina, shall constitute a Board of Pharmaceutical Examiners for the city of Columbia, to hold office for the term of one (1) year. Any vacancy or vacancies occurring in the course of the year in either or both of the above-mentioned boards, shall be temporarily filled by the appointment of the president of the said Association. The said boards shall be styled "The Boards of Pharmaceutical Examiners," and shall meet respectively, in Charleston and Columbia, once every three (3) months, and keep in session until applicants who have previously made application to the secretary of the said Association shall have been examined. And four (4) members of either of the said boards shall constitute a quorum for the transaction of business and the granting of licenses.

SEC. 4. That from and after the passage of this act, the said Board of Pharmaceutical Examiners shall alone possess and exercise all the powers heretofore given and now possessed by the faculty of the Medical College of the State of South Carolina and the medical faculty of the University of South Carolina, in respect to the license of pharmacists, apothecaries, and druggists.

SEC. 5. That every pharmacist, apothecary, or retail druggist who carries on and conducts the business of such occupation in this State, after the expiration of three (3) months from the passage of this act, must have a license therefor from one of the above-named boards. And any person who shall thereafter carry on and conduct the business of said occupations, or any of them, without such license, shall be liable to indictment as for a misdemeanor, and on conviction, subject to a fine not exceeding five hundred ($500) dollars, or imprisonment not exceeding six months.

SEC 6. That before granting said license, except in cases hereinafter excepted, each applicant therefor shall undergo an examination by and before that board to which the application is made, and of such nature as they shall require; but such examination must include the reading of manuscript prescriptions and explanation thereof, the discovery or detection of unusual doses of drugs, and especially poisons, the recognition and distinguishing of the various roots, barks, leaves, fruits, resins, and gums in common use, and the proper antidotes and mode of administration thereof for the different poisons.

SEC. 7. That no examination shall be required in case the applicant is a regular graduate in medicine or pharmacy of a school that is in the "ad eundem" of the University of South Carolina, or the Medical College of the State of South Carolina; but such an applicant shall be entitled to a license upon furnishing evidence of his graduation satisfactory to either of the said boards, and upon payment of a fee of five ($5) dollars for the license. That in case the applicant undergoes examination, the charge for the same and granting the licenses shall not exceed ten dollars, one-half of which shall go, in case the applicant was examined before the Charleston Board, to the Medical College of the State of South Carolina, and in case the applicant was examined in the city of Columbia, to the University of South Carolina; and the balance in both cases to the Pharmaceutical Association of the State of South Carolina.

SEC. 8. That it shall be the sole duty of the Pharmaceutical Association of the State of South Carolina to establish, carry on, and preserve in a book to be kept for the purpose, a register of all pharmaceutists, apothecaries, and retail druggists in the State, including the names of persons registered, place of business, the fact whether the person registered be a graduate in medicine or pharmacy, or whether under license granted on examination, and any other matter of information the said Association may see fit to add.

SEC. 9. That it shall be the duty of all licensed pharmaceutists, apothecaries, and retail druggists, by whichsoever of the said boards licensed, to have their names registered in manner aforesaid by the Pharmaceutical Association of the State of South Carolina, and to report annually, on or before the first day of November of each year, to the said Pharmaceutical Association of the State of South Carolina, whether any, and if yea, what change has occurred within the then preceding year as to their respective places of business, and for omission or neglect of the requirements of this section, or any of them, they shall, respectively, incur a fine of twenty-five dollars; and for each and every registration or change thereof, the party so registered shall pay to the secretary of said Association the sum of one dollar, which shall be their compensation for the services performed in accordance with the provisions of this act.

SEC. 10. That it shall be the duty of the Pharmaceutical Association of the State of South Carolina to make a correct report to the General Assembly of work done by them, in accordance with the provisions of this act, on or before the first day in December in each year.

SEC. 11. That every pharmaceutist, or other person selling any poison, shall be satisfied that the purchase is made for legitimate purposes, and shall keep a book, in which shall be recorded every sale of the following articles, viz., arsenic and its preparations, all metallic cyanides, and cyanides of potassium, tartar emetic, corrosive sublimate, aconite and its preparations, strychnine, and all other poisonous alkaloids and their salts, cantharides, ergot, hydrocyanic acid; the said record also to exhibit the name of the person to whom sold, place of his residence, and purpose of purchase as stated, which book shall be kept at all times subject to the inspection of the coroner of the county and the solicitor of the said Association, or such other persons as either of them may designate.

SEC. 12. That all persons in this State engaged in business as pharmaceutists, apothecaries, or druggists, either in the wholesale or retail of drugs, shall, to every bottle, vial, box, or other package, containing any poison named in the preceding section, or any one or more of the following articles, viz., oxalic acid, chloroform, belladonna and its preparations, opium and all its preparations, except paregoric, digitalis and its preparations, henbane and its preparations, hemlock or conium, or any other article that may be added to this list by the Pharmaceutical Association of the State of South Carolina, securely attach a label, whereon shall be either printed or legibly written with red ink, the name of the poison, and the name of at least one antidote, with brief directions as to the mode of using the same; provided that nothing herein contained shall be construed to apply to the filling of prescriptions made by regular physicians; and provided further, that it shall be the duty of the Boards of Pharmaceutical Examiners, or either of the said boards, on application at the time of registration, to furnish to the party registering a form of label for poisons.

SEC. 13. That this act shall not be construed to prevent merchants and shopkeepers from vending or exposing for sale medicines already prepared; provided such merchants and shopkeepers shall attach to the article sold a copy of the label attached thereto by wholesale druggists, and in the sale of poisons, shall comply with the provisions of Sections 11 and 12 of this act.

SEC. 14. That it shall not be lawful for the proprietor of any pharmaceutical shop to allow any person not qualified in accordance with the provisions of this act, to dispense of poisons, or compound the prescriptions of physicians; and any person who, upon indictment for violation of this section, shall be convicted of the same, shall pay a fine not exceeding five hundred dollars, or suffer imprisonment for a period of not more than six months.

SEC. 15. That this act shall not be construed so as in any way whatsoever to affect those who have, previous to the date of the passage of the same, obtained a license from the Medical Faculty of the University of South Carolina, or the Faculty of the Medical College of the State of South Carolina, nor in any way deprive the said faculties of granting diplomas to pharmaceutists, apothecaries, and druggists, who may have duly graduated in the Medical College of the State of South Carolina or the Medical Department of the University of South Carolina, respectively, by virtue of which the said graduates shall be entitled to license without examination, upon payment of a fee of five dollars as above mentioned.

SEC. 16. That the said Association is hereby authorized, through and by its solicitor or otherwise, as it may deem most expedient, to prosecute all persons violating the provisions of this act, or any of them.

SEC. 17. That all acts or parts of acts, inconsistent with or repugnant to this act, are hereby repealed.

Approved the 10th day of March, 1876.

STATE OF SOUTH CAROLINA,
OFFICE SECRETARY OF STATE.

I, H. E. Hayne, Secretary of State, do hereby certify that the foregoing is a true and correct copy of the original act now on file in this office.

[SEAL.] Given under my hand and the seal of the State at Columbia, this 17th day of March, 1876, and in the one hundredth year of American Independence.

H. E. HAYNE,
Secretary of State.

SPECIAL AND VOLUNTEER REPORTS AND ESSAYS.

I. PHARMACY.

PHARMACY IN SOUTH AMERICA.*

BY PROF. C. G. WHEELER.

There is much similarity between the various republics of the southern hemisphere as regards pharmacy; Italian and French systems seeming to be the models accepted, at least in very many of their leading features. The republics where general culture and intellectual activity stand the highest, make also the best showing as regards the condition of pharmacy. Foremost should be placed the Argentine Republic and Chili; the *first* place being accorded to the former country. I shall therefore only go into detail with relation to the Argentine Republic, contenting myself with briefer statements relative to the other countries.

PHARMACY IN THE ARGENTINE REPUBLIC.

The pharmacists of the Argentine Republic are chiefly foreigners, mainly Italians, although the proportion of natives is steadily increasing. In 1875 there were 224 persons who had a license to carry on the business, and of these but 68 were natives. About 70 pharmacists are in Buenos Ayres. There are a good number of French and German druggists, and a few English ones in the larger cities.

The business is indirectly under government control and supervision. The awarding of licenses to pharmacists is, after an examination, the business of the faculty of the government school of medicine. The annual examination of the drug stores is attended to by the Board of Health. Provision is made by the government for a regular preliminary and also a professional course of training

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* Presented at the Seventh Session.

for pharmacists. Thus, beyond the general practice in our own country, the profession of pharmacy is guarded and fostered with judicious care by the general government of the Argentine Republic.

Unlike most countries of continental Europe, there is no limit set to the number of pharmacists who may establish themselves in a given town or city. Each pharmacy, however, must be represented by a pharmaceutical chemist, although it is not required that he give personally his attention to the business. As his license is personal and does not contemplate any particular location, he is at liberty to open branch establishments wherever he may choose. This concession has led to an *abuse*, toward correcting which earnest efforts are now being put forth. These grew out of the circumstance that parties holding a license to practice pharmacy, would open branch establishments at various points and giving no personal supervision themselves, would leave them in charge of persons utterly incompetent to attend to the dispensing of medicines. It is true that on opening a pharmacy they are required to give notice of the fact to the Board of Health, yet this is a *mere form*, and does not involve any inspection by a proper authority, to ascertain whether the pharmacy is suitably equipped or provided with a trained pharmaceutical chemist. Thus it happens that sometimes a woman or even a child may be seen in charge of the drug shop, while the principal is absent for an hour or two. Even when the incompetent manager of the branch business is himself present, it is not uncommon for him to dispatch a boy by the back door, to some neighboring skilled druggist to execute a prescription, while he with pleasant words craves the indulgence of his customer on account of the *care* and *time* requisite, in order that his (?) dispenser may compound the difficult prescription.

The use of patent medicines is much more common in South America than it is even with us. Physicians prescribe them to a large extent, so that fortunately, in view of the abuse just referred to, the keeper of a pharmacy can thereby escape with fewer blunders.

In order, however, to correct this evil, the Society of Pharmacy at Buenos Ayres had, at its meeting on the 21st of last March, prepared a petition, and transmitted the same to the assembly, in which it is requested that provision be made for a class of *pharmacial assistants* to be denominated "Dependientes Aprobados."

The petitioners request that it may be by legal enactment forbidden to carry on a pharmacy without either the personal attendance of the licensed pharmacist himself or a "Dependiente." The latter are to pass an examination in

I. Reading and preparing two prescriptions.

II. Recognize by their physical characters and determine the dose of four chemical products and four organic preparations.

III. Perform three simple operations in practical pharmacy. Those passing a favorable examination are to receive a certificate sealed with the society's seal.

Licentiates in pharmacy are those who having passed a satisfactory examination before the Faculty of Medicine, are awarded a diploma, and authorized to establish themselves as druggists wherever in the republic they may find a promising opening.

To prepare applicants for this examination there is a course of study in the College of Medicine, especially intended for pharmacial students, and extending over a term of two years. To enter upon this course, certificates must be brought of having completed studies in grammar, geography, history, mathematics (higher and elementary), literature, one modern language, Latin, ancient or Greek, moral and mental philosophy, physics, organic, inorganic, and analytical chemistry, and natural history. The three last-mentioned studies must have been pursued at a national college.

At the present time there are but two chairs of the "College of Medicine and Pharmacy" at Buenos Ayres, especially devoted to giving instruction to students in pharmacy. These are the professorships of botany and of pharmacology. Such other branches as they pursue are studied in common with the medical students.

Besides these provisions for instruction to students of pharmacy at the "College of Medicine and Pharmacy," the faculty also examine and award licenses to those who may have pursued similar studies elsewhere. Foreigners who may have graduated at colleges of pharmacy in other countries are not exempt from this examination, if the said colleges were not connected with regularly established universities. The examination is both a theoretical and a practical one. Theoretical in physics, chemistry, natural history, and pharmacology, and practical in the latter branch, including the making of eight pharmacal preparations. The fees are about fifty dollars.

INSPECTION OF PHARMACIES.

This occurs but once each year and is attended to by the Board of Health, at least two members of which are always pharmacists.

It is aimed at being such an official examination as is usual in most of the continental states of Europe; it can however hardly be considered as yielding altogether satisfactory results, from causes all of which I cannot here enumerate.

One of the chief difficulties is that the inspection does not occur sufficiently frequent. Often directly after the official examination has taken place, parties will open pharmacies and carry them on in a manner altogether to the reproach of the profession and prejudice of the community, resting perfectly secure from investigation for the period of a year. Then they will properly equip their establishments and reform their methods of doing business in time for the duly announced annual inspection, only to go on in a like illegal manner after the official visit has taken place.

Again it is beyond all doubt an error, for reasons that are apparent, to have a board of inspection consisting almost entirely of medical men. Doubtless special experience in pharmaceutical matters should be as highly esteemed in the Argentine Republic as elsewhere.

It is also a faulty method to announce the time of inspection a long period in advance. Abundant opportunity is thus given to the unscrupulous druggist to duly "set his house in order," that the periodical visitation may not disastrously affect him.

In general I noticed that the honorable and thoroughly competent pharmacists in Buenos Ayres, entertained grave suspicions of the value of the inspection, from the superficial and inadequate manner of its performance.

"*La Sociedad de Farmacia Argentina*," or "Argentine Society of Pharmacy," located at Buenos Ayres, is the national pharmaceutical organization of the profession in the republic. It has done much during the twenty years of its existence to elevate the profession, and is still very useful. There are at present fifty-four active and about forty corresponding and honorary members. The president is the distinguished chemist and pharmacist, Prof. Kyle, originally from Scotland. The Society has a library and collection located in a central position, at the corner of two principal streets in Buenos Ayres. These meetings of the Society are held monthly, one for business, and two for the discussion of scientific and professional questions.

Each year prizes are offered for the best memoir or research in chemico-pharmacy. The Society appoints a committee of three of its members to examine the manuscripts and report the successful competitor.

One feature of the Society is peculiar. With the fees, dues, and fines there has now been accumulated a fund from which, on the death of an active member, five per cent. is paid to the family of the deceased. The capital now amounts to nearly $10,000. The initiation fee is $12.00; the monthly fee is $1.20. There is, thus, life insurance connected with the privileges of membership.

"Revista Farmaceutica," the title of the journal of the Society, its official organ, and now in the eighteenth year of publication, is a monthly large octavo of forty-eight pages. It is edited by a committee of five, and furnished gratis to all members. Besides Argentine pharmaceutical news, it contains the proceedings of the Society and various scientific articles, largely translations.

Miscellaneous Items.—There is no Argentine Pharmacopœia, but those of various European nations are used, usually according to the nationality of the respective physician prescribing. When no particular one is specified, that of the French (Codex Français) is used.

The drug stores of the republic resemble, as to their fitting, more those of the continent of Europe than any others I have seen. They are mostly small, and, while as a rule neatly furnished, there is no attempt at display. The long list of extraneous wares kept at druggists in England and in the United States is not found, nor are mineral waters or soda ever kept on draught. There is a printed tariff of retail prices, which all respectable druggists adhere to. It is rather higher than usual in the United States.

The Argentine Republic has produced at least one work on a pharmacal subject which, in Spanish, is perhaps one of the best. I refer to Carlos Murray's "Pharmacy and Pharmacognosy," now passed to a second edition.

PHARMACY IN CHILI

Is not altogether in as satisfactory a condition as in the Argentine Republic, though the general features are much as in the latter country. I will only allude to some that differ considerably.

The profession is largely in the hands of foreigners, few of whom are Italians. English, French, and German, particularly the latter, have most of the better shops. The government now appears to have entered upon the policy of restricting the number of foreigners in the business, and of stimulating the natives to secure its control. Therefore of late years the examination in the case of foreigners has been exceedingly severe, more so, I should say, than in any other country of the world, if the representations made by some who have passed the ordeal can be relied upon. In one case the chemical examination alone involved six weeks of laboratory work as the practical portion of the examination. It was required to find out the composition, qualitative and quantitative, of specimens of paraffin, peat, and a mineral water. No amount of experience in other lands or diplomas of foreign countries can cause this examination to be lightened. For natives, or others, a course of two years is provided in the university at Santiago, but most of the studies are such as pertain to a general education, and those which are specifically pharmacal, I am informed, by competent judges, are not very thoroughly taught. Discipline is said to be lax, and superficiality in scholarship the rule. The examination at the close of each year does not compare in severity to that the graduate of a foreign school of pharmacy would be subjected to on seeking admission to the ranks of the profession in Chili.

There is a small society and journal of pharmacy at Santiago, neither of which exert any very commanding influence.

What I have said regarding the character of the places of business in the Argentine Republic will apply equally well to Chili. In the large cities a certain number of druggists, as indicated by the Intendente, must remain entirely open each night for a week; all others may close completely by ten o'clock. Another set must remain open the following week, until the round is completed. In a population of forty thousand only two druggists, as a rule, would form the night contingent for one week. Retail prices are not uniform, and are very high. Chili is materially the most prosperous of the South American republics, though one of the youngest. It is not unlikely that the condition of pharmacy will steadily improve, as nearly all material, social, and intellectual relations are constantly doing in this enterprising republic.

PHARMACY IN URUGUAY.

This smallest of the South American republics—having a population only equal to the city of Chicago—hardly requires a special reference. The general character of pharmacy is as in the neighboring Argentine Republic. There is a course for pharmacists in the university at Montevideo, though hardly an adequate one.

Uruguay has no society of pharmacists or journal devoted to pharmacy. The country is without any indigenous workers in any department of science, pharmacy included. The political disorder prevalent is not favorable thereto.

PHARMACY IN BRAZIL

Is to a considerable extent in the hands of foreigners in the larger cities, but elsewhere there are few others than natives engaged in the business. Patent medicines form the principal bulk of the stock kept by a Brazilian druggist, chiefly French, English, and American. Many nostrums that have had their day in the United States, also some that are little known with us, though made here, are enjoying a very great popularity in Brazil. These patent medicines are so largely prescribed by the physicians of the country that the compounding of medicines, or regular prescription work, forms comparatively but a small share of the pharmacist's ordinary duties. In short, he is in the main but the retailer of packages of medicines, put up ready for the patient's use by the foreign manufacturer, and supplied at wholesale by the importing house at Rio Janeiro.

There is no national Pharmacopœia, but those of various European nationalities are used, guided generally by the preference of the respective physician. The weights and measures employed are those of the metric system.

It is not uncommon for a physician to have an interest in the profits of the pharmacist to whom he directs his patient, a practice which I believe is not altogether unknown in the United States.

The drug stores in Brazil resemble, as to their fitting up and general appearance, more nearly those of continental Europe than they do those of this country. Their fixtures are, to a large extent, supplied from France and Germany.

The miscellaneous and *extraneous* articles usually found in a drug store in the United States are not found at the druggists of Brazil, except to a comparatively very limited extent.

The display and elegance of the leading drug establishments in our large cities is nowhere equalled in Brazil, any more than is the case in the various countries of Europe.

Graduates in pharmacy in foreign countries are permitted to establish themselves as druggists in Brazil, upon satisfactory evidence of their having completed a pharmaceutical course of study. If they have not graduated at a school of pharmacy connected with some *university*, they are, however, usually required to pass a rather detailed examination.

Many of the natives who are pharmacists have acquired their knowledge of the profession entirely of other druggists, and then been admitted to practice on examination by the Board of Examiners provided for that purpose at Rio Janeiro.

The Faculty of Medicine, however, at Rio Janeiro and at Bahia, provides a special course in pharmacy, in which the following subjects are taught: Physics, chemistry, mineralogy, botany, materia medica, and pharmacy.

The students have the advantages offered by a chemical laboratory, physical cabinet, natural history collection, and a practical dispensatory.

At Rio Janeiro there were, in 1874, 113 students of pharmacy, and 95 at Bahia. In the same year there graduated, at Rio, 32; at Bahia, 64. There is a matriculation examination for the students in pharmacy, in the following branches: Arithmetic, geometry, and French.

There are in Brazil the following pharmaceutical societies: the Pharmaceutical Institute of Rio Janeiro, the Brazilian Pharmaceutical Society, and the Pharmaceutical Academico Atheneum.

The first-mentioned carries on, with the assistance of the government, a so-called "School of the Humanities," which appears a sort of preparatory institution for pharmacists. This Society also publishes a review, entitled the "Tribuna Pharmaceutica."

The Brazilian Pharmaceutical Society publishes a monthly periodical, denominated "Abelha" or "The Bee."

All the three societies above mentioned co-operate in the formation and revision of the official course of study insisted upon by the Imperial government for those contemplating the profession of pharmacy.

REMARKS ON THE CONDITION OF PHARMACY.*

BY D. BENJAMIN.

I PRESUME that every member of the Association present feels anxious to elevate the standing and improve the condition of the pharmaceutical profession. And I also believe that the interest manifested is not selfish, but based to a great extent, at least, upon the broad principles of science and the welfare of mankind.

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* Read at the Seventh Session.

Such being the case we are at full liberty to discuss the evils that interfere with the success and retard the progress of the profession which we represent. Do not understand me as undertaking in the short space allowed this paper to give this important subject the thorough treatment it deserves, for I will not be able to do more than mention the matter.

In looking back over the history of pharmacy, we find it impossible to tell how long it has been in reaching its present state, for the ancient Hebrew writings tell us that it is the art by which Moses was directed to make the holy ointment (לֶקַח, Exod. 37: 29).

In glancing at the development of the art we find that much progress had been made in the days of Pompeii, for the shop found in those famous ruins, with its arrangements and implements, shows the existence of much system and address.

Since those times intelligent and learned men throughout Europe, drawing information and aid from botany, chemistry, zoology, and every other source, have greatly enriched the science.

In later times American pharmacy has been endowed by the labors of such men as Procter and Parrish, now dead, and a host now living, some even present, to whom we point with pride, whose names are familiar to you all.

By the zealous labors of such men the dignity of our profession has been exalted to its present condition; the wants of civilization have been met, and the science kept abreast of every other. The secret chambers of the laboratory of nature have been invaded and their useful stores distributed to man. Even the subtle virtues of plants have not eluded this search, but their most powerful active principles have been dragged forth to assist physicians in their warfare against disease, alleviating the sufferings and assuaging the miseries that flesh is heir to.

Not only have those gifts, more precious than gold, been extorted from the frugal hand of nature, but methods never before dreamed of for preparing and preserving them have almost bid defiance to the deteriorating influences of time and place, and made them most portable and convenient remedies.

Excellent colleges have been established throughout the world for the purpose of preparing young men for the profession, and the platform on which we stand and the system by which we work have been greatly strengthened and improved by the adoption of national Pharmacopœias.

Notwithstanding these pleasing considerations, there remains much to be done to deliver us from the baneful influences that are so perceptibly at work. The accurate, the learned, and careful pharmacist is often represented or misrepresented by ignorant quacks, at whose hands the professions of pharmacy and medicine suffer as well as the public.

I need allude to but few of the evils that are operating against us, for I think you agree with me that it is high time to bestir ourselves for improvement.

We have been too narrow-minded, and have not striven to advance our reputation and influence, or elevate the requirements of a pharmacist.

Men more greedy of pecuniary gain than anxious to acquire science and skill have attempted not only to conduct the business without sufficient or intelligent help, but have tried to superintend a number of drug stores at once.

The easy and rapid multiplication of stores has done injury, not so much in a business point of view as in degrading the profession from its high standing to a level with those trades which require no great professional culture. Men of wealth, unacquainted with our art, will as a mere investment start those in the business who have been too negligent or lazy to prepare for the responsibilities of the position. Thus the country becomes overstocked with a class of unfinished druggists, whose ideas of the dignity and importance of the profession are so low as to allow them to indulge in the greatest irregularities, flooding the country with patent medicines, and selling intoxicating liquors regardlessly at every opportunity ; not placing much value upon their own productions or acquirements, they undervalue the finest fruits of skill and art.

Owing to the want of discrimination on the part of the public, respectable pharmacists are compelled in many instances either to relinquish business or modify it to suit circumstances.

A striking proof of the estimation in which we are held by the people, and even the legislators, is given in the fact that we have been scheduled with and classed on a level with the lowest grog-shops that infest the land. It is high time that pharmacists should arouse from their lethargy and insist upon improvement. In order to realize the unwholesome condition of pharmacy, let any competent man purchase samples of preparations from the different stores in any of our small cities, or even in the larger ones. Let him buy tinctures of opium, digitalis, nux vomica, iron, aconite, or other preparations, which depend upon the skill and care of the druggist for their activity, their value, their *uniformity*. If he has not previously studied the subject he will be astonished on testing these samples to see how widely they differ.

In the practice of a physician druggists often escape censure, because the uncertain action of the medicine is attributed to the variableness of disease or constitutional peculiarities of the patient.

To illustrate still more perfectly the subject, let me mention that I obtained recently three specimens of solution of acetate of ammonium from three separate stores. The first required four fluid drachms of diluted acetic acid to neutralize two fluid ounces; the second required two fluid drachms, and the third sample, from a graduate in pharmacy, required no less than five fluid drachms of vinegar to neutralize the two ounces. Why torture the sick with these things? Let them die in peace.

This leads me to mention a great fault in the teachings of the colleges, that is, the want of practical training. It is an acknowledged fact that no man can learn pharmacy from lectures or from books; he must have practical as well as theoretical teaching. With a view to provide for this some of the best colleges require a man to practice under the guidance of a preceptor four years before he can graduate; but experience shows me and you, I think, that this provision is *not* sufficient; at least it has not proven successful so far, simply because the preceptors themselves have not been taught. To instance a case in point, I would mention a *preceptor* who had been for eight years one, and did not know the difference between troy and avoirdupois weights, and prepared medicine with either; whose tincture of aconite root was prepared by macerating the unground root fourteen days in alcohol, and whose tincture of iron was prepared by macerating common subcarbonate of iron in commercial "spirits" of salts. I have in mind other preceptors, but one is enough for the purpose.

Every college should possess a laboratory, in which the student should, under the eye of a thorough master, prepare each medicine after it has been lectured upon by the professors.

Even to-day, unwelcome as the fact may be to men who have spent years of hard training in pharmacy, it is true that not even an examination of competency is required of any one who dares to assume the responsibilities of a pharmacist in many of our large cities and populous districts.

Much more ought to be said; indeed, I have scarcely touched the subject. But if you think upon these things as I have thought upon them, you will feel the necessity and importance of making an effort to secure a higher education for pharmacists, and more success in benefiting the world.

APPRENTICESHIP.*

BY CHARLES BECKER, GEORGETOWN, D. C.

TOUCHING upon the different questions relating to the elevation of the occupation of a pharmacist to its proper standard, viz., that of an honored profession, there are few, if any, of such vital importance, and which at the same time have received as little attention, as that of proper and uniform rules for the apprenticeship of boys.

Under the present system, boys are in a great many instances taken into drug stores, not with a view of thoroughly educating them for our profession, but for the purpose of getting for a comparatively small consideration some one to do the rough dirty work about the store, and to be replaced by others whenever their expectations as to salary are getting too extravagant, which generally happens as soon as they learn to distinguish rhubarb from orris root. Thus a number of young men are yearly turned loose as full-fledged drug clerks, who have from one to three years' experience in putting up hair oil or paregoric, who know the price of soothing syrup and vinegar bitters, and who stand ready at any time to dispense on application something for neuralgia, cholera infantum, or dyspepsia, but who are perfectly at sea when asked to prepare some sweet spirit of nitre, fluid extract of ergot, or tincture of chloride of iron. After floating about for a few years as clerks, they confer a blessing on some community by opening a drug store where medical advice is dispensed as cheap as epsom salt, and where in a great many instances the sale of intoxicating liquor by the drink, this prostitution of our profession, forms the principal source of income.

To employ boys as apprentices is, to say the least of it, a very unthankful undertaking, and according to the writer's experience, a very expensive one; the breaking of graduates, funnels, etc., waste of goods in careless handling, carelessness or forgetfulness in the matter of charging goods sold on credit, and a dozen other ways of waste, go to make up a considerable item in the course of a year, while the continual watching and supervising of everything done by such apprentices is almost equivalent to doing the work yourself.

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* Read at the Seventh Session.

On the other hand it cannot be denied that in a great many instances, where a boy enters into an apprenticeship with the expectation of being taught the arts of our profession, and finds that he is allowed to acquire all the knowledge he wants, provided he can pick it up himself, whenever between putting up cattle powders, filling out castor oil in vials, or perhaps even attending to a tippling business in the back room, he can find time to study the U. S. Pharmacopœia, or such other books of reference as may be at hand, there is plenty of room for faultfinding on that side of the house.

Now, it appears to me that if, through the auspices of this Association, a uniform system of apprenticeship and proper tuition of boys could be brought about, it would be a boon to both employers and employés, and to further this end, I would move that a committee be appointed whose duty it shall be to endeavor, by corresponding with the different schools of pharmacy and pharmaceutical associations, and such other means as they shall think proper, to bring about a uniform system of apprenticeship, in establishing a proper term of years and a uniform scale of compensation (if any) for such, to encourage proper tuition of such apprentices by their employers at home, and at schools of pharmacy where such are accessible; also to consider the advisability of establishing a proper grade of elementary education as necessary for boys before becoming apprentices, and furthermore, a certain grade of efficiency to be acquired by such apprentices before being allowed to assume the responsibilities of clerks or assistants in drug stores, this committee to report to the Association at its next annual meeting.

SUBSTITUTION OF PARTS BY WEIGHT FOR ABSOLUTE QUANTITIES.*

BY PROF. S. P. SHARPLES.

QUERY 30.—What advantages would result from the substitution of parts by weight for absolute quantities in the revision of the Pharmacopœia, and if any disadvantages other than those incident to change, what are they?

So much was said on this subject at the time of the last revision of the Pharmacopœia that anything that can now be added, seems like a waste of ammunition, or rather like firing at a fort after it has been taken, but in this case, although the fort was taken it was rather a Tartar capture, as many members of the Association found to their surprise when they came to examine the new edition.

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* Read at the Seventh Session.

The advantages of the proposed change are, first, that by so doing the work is brought into harmony with the European Pharmacopœias. This is perhaps more a theoretical than a real advantage, since every country has its own Pharmacopœia.

The greatest advantage is that by the use of parts by weight, no one is restricted to any particular system of weights, but can use troy, avoirdupois, metrical, or any other system of weights that may be convenient.

Those who favor the introduction of the metrical system bring it forward as a strong argument, that if parts by weight are used, that the Pharmacopœia will need no further change to adapt it to that system, and we may add that if parts by weight are used, the present system of weights and measures would be quickly abandoned for the metrical.

Another advantage of parts by weight is, that we may call these parts pounds, ounces, drachms, or grains, and so vary the amount of the product without the trouble of multiplying or dividing the weights given.

So far for theory; when we come to practice, with our present want of system of weights, we find the case somewhat more complicated.

If, for instance, we take a formula like the following:

℞.—Magnesium Citrate,	℥v.
Sodium Bicarbonate,	℥vj.
Acid Citric,	℥v.
Sugar,	℥v.

there is not the slightest objection to stating it in parts, and leaving it to the judgment of the compounder as to the size of the parts, whether he will call them drachms, ounces, or pounds.

When it comes to a complicated formula like the following, the case becomes different, and the ordinary mind wishes some guide. This might perhaps be supplied by adding the direction, take in grains, or take in ounces, or by giving the weight of the product when taken in grains, ounces, or pounds:

℞.—Sugar,	℥iv.
Acid Citric,	℥v.
Sodium Bicarb.,	℥vij.
Magnesium Carb.,	grs. lx.
Calcium Carb.,	grs. lxxiv.
Sodium Sulphate,	grs. cxxviij.
Sodium Chloride,	grs. cxxviij.
Ferrous Carb.,	grs. vij.

This becomes somewhat fearful-looking when reduced to parts, as follows, and with the weights in use, we fear that it would take longer to reduce these parts to manageable terms than it would to prepare five or six pounds of the powder:

℞.—Sugar,	1920	parts.
Acid Citric,	2400	"
Sodium Bicarb.,	3360	"
Magnesium Carb.,	60	"
Calcium Carb.,	74	"
Sodium Sulphate,	128	"
Sodium Chloride,	128	"
Ferrous Carbonate,	7	"

In fact, with such formulas as the above, the Pharmacopœia would no longer serve its purpose, a rule of thumb by which the most ignorant man can scarce go astray, but each one in attempting to use it must spend much time in reducing its figures to his weights, that is, if he uses pounds, ounces, and grains. With the metrical system the above becomes very easy to prepare.

The case becomes even worse when it is attempted to introduce parts by weight for volume. It would be an almost endless task to reduce the formula given in the Pharmacopœia to parts by weight instead of volume. On our first attempt we find that one very important factor has been left out of the account.

In very few cases do we find the sp. gr. of the various fluid extracts, tinctures, and so on given, and without this important item, it is rather difficult to reduce a volume factor to a weight factor. To reduce to parts by weight,—for it must be remembered that in this reduction we must keep the product of the same strength, that is, a volume must contain the same amount of active ingredients as before, since they must be still dispensed by volume,—we would evidently have to prepare each of these compounds with the utmost care, and then carefully determine its specific gravity; a task which I should judge the most earnest advocate of parts by weight might well think of twice before he undertook it.

This same argument applies with equal force to the suggestion that all dispensing be done by weighing, and not by measuring; since in all cases the dose must as a matter of necessity be measured and not weighed; since the druggist can scarce be expected to put up his fluids in separate packages as is done in the case of powders and pills.

Weighing will never supersede measuring for many purposes, and it should not in all cases when great accuracy is not required. Measuring is much the most convenient method of proceeding, and if suitable measures are used, it approaches in accuracy weighing.

When a chemist wishes to do some of his most accurate work, he measures the liquids used, and does not weigh them, weighing being used only in certain exceptional cases.

After carefully looking over the whole subject I cannot but think that the committee of twelve was wise in rejecting the advice of the large committee, and adhering to the old system, so long as the present weights and measures, which have no simple relation to each other, are retained.

I should however be glad to hear the other side of this question supported, more especially as I have been led by the examination I have made of this subject to a conclusion that is exactly opposite to the opinion I had formed before investigating it.

I therefore move that the question be continued.

THE DISPENSING DEPARTMENT.*

BY JOHN F. HANCOCK, BALTIMORE, MD.

QUERY 49.—In the arrangement of the dispensing department of a pharmacy, what advantages are there in having the counter upon which prescriptions are prepared in full view of the customer?

THE proposition which we accepted as a subject to be discussed is one which appeals to individual fancy, location, and the internal arrangement of the pharmacy, at the same time presenting a material problem of trade and professional interest. Mental anxiety and personal annoyance with the probability of real or imaginary mistakes are the more prominent points to be considered. The prescription business in most of the large cities, where it is expected that the highest degree of art and professional skill is to be found with a due regard to æsthetic arrangement, is so largely distributed among the numerous stores, that as a rule, the best arrangements for conducting the prescription business will not pay, consequently we find comparatively few pharmacies replete with conveniences in this department. On the contrary, it is not uncommon to find elaborately furnished establishments and less attractive shops where the soda cocktail and cigar departments have received more attention in cost of furniture and convenience of arrangement than the department for compounding prescriptions,

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* Read at the Seventh Session.

and frequently they are looked to as the means of affording the larger share of trade profit.

The little box on the front counter, behind which the pharmacist hides himself while compounding the prescription of his customer, is in many cases the best that can be devised under the circumstances, and is quite convenient in the many cases where the trade of the shop will not admit of more than one dispenser; for in this position the compounder can, with more convenience and greater expedition, receive the numerous small orders that may come in before it is possible to finish his prescription, and which if not promptly noticed may disappear, to be presented at some other counter in the neighborhood. The location of a pharmacy and the character of the trade are questions always to be considered. The establishment of a central store must depend very largely on the soda-water business and fancy goods trade, as in very few instances would the strictly constructed pharmaceutical business pay the expenses. In the suburban store the pharmaceutical branch is the chief dependence, and the fancy goods branch is more of a means to elaborate and to decorate than as a direct means of profit. In considering the subject before us, we will dismiss the small suburban pharmacy and the more extensive central establishment, and consider the average pharmacy with an extensive trade and with an intelligent class of dealers.

The question before us has engaged the serious attention of thoughtful pharmacists leading to different conclusions. To many of those who come with prescriptions, particularly servants and children, it matters very little as to what arrangement is made for compounding, but to solve the question it becomes necessary to consider that class of customers who are anxious and over-exacting in their demands upon the time and skill of the compounder. This is the only class who are likely to give trouble, and they frequently belong to those who are good customers if indulged in their perhaps unreasonable requests. In physic we know that diseases are frequently cured by reaching the malady through the avenues of the mind, so in pharmacy the vigilant pharmacist will frequently succeed in pleasing his patrons by catering to their intellectual cravings and indulging individual peculiarities, nor can this be called humbugging the people when prudently indulged. An arbitrary rule will not suit all cases, as frequently an excited mind will see an object without a physical presentation, and requires to be treated according to its abnormal condition. The customer who presents a recipe to be compounded for a dearly loved friend whose life is suspended as it were on a delicate thread, which delay or inattention would permit to be easily snapped in two, is very likely to be in a state of deep solicitude, and every movement of the dispenser is likely to be watched with the greatest anxiety. These are the cases which are numerous and should be considered. As may often happen, let the wife of a dying husband or the mother of a darling child upon whom her earthly hopes are centred, present herself at the counter of a pharmacy. Let the prescription be compounded on the front counter; two chances to one the pharmacist will be annoyed by frequent questions and be delayed in the work with which he is engaged, and if the scales are in full view of the customer his every action is watched, and very likely criticized. Should the prescription, on the other hand, be taken to a separate room or beyond the view of the customer, all kinds of things are likely to be imagined. The pharmacist may be consuming too much time; it may have been placed in the hands of a boy; proper and prompt attention may not be given to the work; so by the time the package is handed out every minute has been magnified into a half hour, and all kinds of imaginings indulged as to whether correctly compounded and by whom.

Should the prescription department be conveniently arranged in rear of the front counter, and in full view of customers, most if not all of the troubles enumerated will have been avoided. We are convinced by experience and observation, that when the prescription business is sufficiently large to warrant careful and expensive arrangements, and the rooms large enough to admit of the proper safeguards, that the counter or counters upon which prescriptions are compounded should be placed in a separate room, or sufficiently far from the front dispensing counter to prevent conversation and the near approach of the customer, but in all cases the counters should be clear and in full view of the customer, in order that they may observe the progress of the work. We would suggest that it would be a greater protection if the compounder is further protected by a plate-glass window, which will more certainly preclude the possibility of interruption, at the same time permitting the customer to see that the pharmacist is intent on the work of compounding. One advantage in a separate room for compounding prescriptions consists in the convenience and protection which is sometimes afforded the operator when difficulties arrive, and it becomes necessary to consult authority for required information.

This cannot be done so conveniently when in proximity to the customer, particularly when expedition is requested.

To recapitulate, 1st. It has been demonstrated in practice that the prescription department will answer a very good purpose, and in case of limited assistance, is more convenient when arranged on the front counter. 2d. We express the conviction that a separate room for compounding prescriptions where the operator is hid from view, is highly objectionable, and in ordinary cases could not be conveniently and economically managed, from the fact that the compounder cannot superintend the dispensing counter. 3d. We are convinced of the wisdom of the following modification in the average pharmacy, viz., that the prescription department be arranged in a separate room or on a rear counter, which shall be in full view of the front store, but sufficiently retired to prevent interruption, as by this means the over-anxious customer will have all fear allayed, and the fact of being permitted to view the operation time will not pass so tediously; at the same time this arrangement will permit the pharmacist, in case of limited assistance, to attend on both the prescription and dispensing departments.

GRADUATED MEASURES.*

BY PROF. S. P. SHARPLES.

QUERY 38.—An examination of the graduated measures supplied by the jobbing druggist or manufacturer. Which are the most reliable?

In accepting this question, it was not my intention to enter into any extended examination of the various graduated measures found in the market, but rather to discuss the methods of constructing and testing such graduates, and to point out certain defects that are inherent in some of the forms used.

An examination of individual graduates would teach nothing, except perhaps showing the general accuracy or carelessness of certain makers, whose measures I might chance to be able to procure.

Each one using graduated measures for nice work must test them for himself. This is easily done with the appliances that all chemists and druggists, of necessity, have at hand. As the same process is used for testing all forms of graduated measures, I will briefly describe it.

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* Read at the Sixth Session.

Since all graduates in common use are professedly standardized at 60° F., it is necessary to raise or lower the water used to this temperature, or else use a correction for the expansion of both the water and the glass. The first method is obviously the easiest.

The graduate should be first carefully balanced on a balance that will turn with at least the $\frac{1}{1000}$th part of the weight used. It is then filled to the first mark with water of the proper temperature, and again weighed.

But here comes in a difficulty, how shall we read its indications? Shall we read the upper edge of the liquid where it cuts the glass? Manifestly not, because the height to which it is drawn is dependent on several different conditions, dependent on the nature of the liquid and the condition of the glass.

The only proper way to read it is to sight across the lower surface of the liquid; but this is only possible in cases where the liquid is transparent. How shall we do if the liquid is opaque? In this case we can only use our judgment, and fill to about the right height. A well-graduated glass should not differ more than one-half of one per cent. of its total volume from its recorded graduation; and, as a general rule, I have found the flasks and other measures supplied to chemists far more accurate than this.

As to the form of graduated measures, those found in the market may be classed under three different heads:

First. The old and time-honored graduate, fashioned like a wine-glass, and in all probability first constructed from that vessel, for the old monks who first practiced pharmacy, chemistry, or alchemy, were also diligent cultivators of the vine, and would be apt to use their glasses in their chemical experiments.

Second. The cylindrical, including under this head the tumbler graduate of the pharmacist, and the burette of the chemist.

Third. The flask, which also includes the fixed volume pipette.

A moment's reflection will show, that of all these forms the old conical one is the most disadvantageous that can be used. This may be easily demonstrated. It is hardly possible to read with the eye and graduate closer than the $\frac{1}{20}$th of an inch.

Suppose we take a glass made in the form of a cone, whose sides make an angle of twenty degrees with the perpendicular, and of sufficient size to hold eight ounces. For the first ounce we will have a perpendicular depth of 1.091 inch, for the whole eight ounces a depth of only twice this or 2.183 inches. Now, as the probable error of reading is $\frac{1}{20}$th of an inch, we have if the measure is accurately graduated, a probable error of plus or minus about seventeen hundredths of an ounce, or over one-sixth of an ounce; and for the reading at the 8-ounce mark a probable error of four times this, or sixty-eight hundredths of an ounce, that is, more than two-thirds of an ounce.

Nevertheless this form of graduate is extremely convenient to use and to clean, and will no doubt long hold its own in cases where no great accuracy is required.

In the tumbler graduate, if made as it should be with perpendicular sides, the accuracy of the reading is strictly proportional to the square of the diameter. and the error instead of increasing with the depth is constant. The unavoidable error of reading will be exactly the same at the eight-ounce mark as at the one ounce.

A tumbler two inches in diameter, with perpendicular sides, will hold an ounce of water for each .57446 inch of its depth; a variation of $\frac{1}{20}$th of an inch in this case will make an error of $\frac{1}{11}$th of an ounce nearly, or in decimals .08703 ounce. A tumbler one inch in diameter will hold an ounce in each 2.2978 inches of its depth, and is four times as accurate as the larger one, or the error in reading will be but about the $\frac{1}{46}$th of an ounce, or in decimals .02176 ounce.

As will be seen, the error of the 2-inch tumbler is only about half that of the conical graduate at the 1-ounce mark, while it is only $\frac{1}{8}$th of the error at the 8-ounce mark. The nearer the conical graduate approaches in form to the tumbler or cylinder, the more accurate, other things being equal, it becomes.

Now, I will admit that for common dispensing work, this error although so large makes but little difference, yet for nice manipulation it is totally inadmissible. It is but little better as a measurement, indeed, I am not quite sure it is as good as the common practice of taking the glassmakers' designation of the bottle as the true capacity, and dividing this into parts by the eye.

Accordingly chemists have, as a rule, abandoned both these forms of measure. The only form of either that is in common use in the laboratory is the burette, and the so-called mixing jars for rough work. But a device is frequently employed in reading the burette which greatly increases its accuracy; that is, the Erdmann's float, by which it can be read to within the $\frac{1}{100}$th of an inch.

In a burette $\frac{1}{2}$ an inch in diameter an ounce of water would occupy a length of 9.21 inches, and the reading by the use of the float would closely approximate the $\frac{1}{1000}$th of an ounce; but this instrument is only adapted for a special purpose, and is not fitted for general measurements.

The last form of graduate or flask, as I have called it, may also be called the constant or single-volume graduate. In its various forms it consists essentially of a flask whose body is large in proportion to its neck. It carries on its neck a single mark. If graduated properly the accuracy is strictly proportional to the square of the diameter of the neck. I have never tested those graduated in ounces, but those graduated in cubic centimetres are generally correct to within less than $\frac{1}{10}$th of one per cent. of their contents. The graduated pipette is but another form of the flask, and its accuracy is also governed by the same laws.

The pipette, with rubber-bulb attachment, is fast becoming popular for accurate dispensing, and when physicians make up their minds to insist that their patients shall use them for measuring doses, instead of the convenient but very uncertain teaspoon, they will be able to study more fully the effect of maximum doses; and when they order a teaspoonful of medicine to be taken, perhaps the patient will get somewhere near that quantity, and not as at present anywhere, from half a drachm to a drachm and a half, according to circumstances. These small-dose pipettes can be constructed and graduated for a few cents each.

In concluding, I must therefore utterly condemn the conical graduate as an instrument of precision, as it only approximates accuracy as it approaches the tumbler in form. I would recommend the tumbler for general use, but for accurate work the burette, pipette, or flask should be used; and each person should at least make a rough test of his measures before using them, and not rely on the name of the maker alone.

MEDICINE WAFERS; SYNONYMS: CACHETS DE PAIN, "CAPSULÆ, SEU OBLATÆ AMYLACEÆ."*

BY G. A. ZWICK.

QUERY 40.—An essay on wafers for the administration of powders, including mode of manufacture, working formula, and samples of product.

THE so-called cachets de pain or breadseals are of recent origin; the leaf or sheet wafer has been in use for a long time, perhaps a century, and has been frequently employed for the purpose of

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* Read at the Sixth Session.

wrapping up nauseous or otherwise disagreeable medicines; but being necessarily bulky in order to envelope the medicine completely, the application was not general, and was in fact little known in the United States excepting to foreigners.

In 1873, M. Limousin, a practical apothecary of Paris, completed and obtained a brevet for the manufacture of the cachet de pain. A notice of this appeared in the "American Journal of Pharmacy" about that time, but no particular attention was paid to it by any one in this country.

While the writer of this sojourned in Germany last year, he first saw these medicine wafers, and made it a point of business to visit M. Limousin, and purchased an assortment of the wafers with press and other appliances; since then nearly 300 presses and two millions of wafers have passed through his hands for parties in the United States. Pending the delay of an invoice of wafers last summer, and with a view of producing the wafers as well as the press at a more moderate price (the press and appliances paying 50 per cent. entry), Mr. Otto Schulte, a gentleman connected with me in my business for many years, suggested that we might perhaps succeed in manufacturing the wafers ourselves as well as the presses.

After considerable experimenting and difficulty, he succeeded in producing a wafer, which, though not as handsome as the French wafers, answers the purpose in every particular just as well as the French cachet de pain, but owing partly to the want of the proper material as also the necessary application of expensive machinery, the appearance of Mr. Schulte's wafer is not so pleasing to the eye, not having that finished elegance of the French make.

Process.—After many trials with various substances, such as starch, rice-flour, arrowroot, in connection with gum arabic, isinglass, gelatin, glycerin, milk and water, the best wheaten flour with simply water was found the best, but even the best flour obtainable had not the tenacity of the Hungarian flour, used for this purpose in Europe. The flour is finely sifted and made into a thin magma with water, about the consistency of thick cream, being diligently and carefully stirred and beaten with a paddle, and then strained through gauze; when perfectly smooth, it is ready for the baking irons; these are constructed upon the same principle that the old-fashioned waffle-irons are, made of the finest steel, and highly polished, as even a scratch will imprint itself upon the wafer.

The baking irons consist of two halves of equal size and outward shape, but the insides facing each other have indentures or cavities on one plate, and corresponding protuberances or convexes on the other; these correspond also, of course, to the size of the wafer desired, as the shape is obtained in the process of baking. They are turned out of the iron in sheets, and between each wafer in this cake or sheet, there must be sufficient space to leave a margin or edge for adhesion, when they are closed after having placed the medicine in them. The sheets or disks are cut up, *i. e.*, the wafers are cut out of them with an instrument similar to the old-fashioned gun-wad cutter; a steel cylinder, sometimes used also for cutting circular labels, if the proper size will answer, but in order to avoid breaking, the disks or sheets have to be dampened.

Special care and particular attention must be paid to every part of the process, and it requires considerable practice and experience to produce even a fair product; the temperature for baking has never been ascertained precisely, but the magma must fairly seethe when poured on the iron. Patient work and intelligent observation are essential, and a great deal has to be learned that cannot be imparted in so many words without actual and practical demonstration.

Mr. Otto Schulte has obtained a patent for this process, and the baking irons and moulds, and M. Limousin, whose process is different from the above, has protected himself also for this country.

As to the application of these wafers, inasmuch as their use has been discussed in the meetings, and the journals as well as the report of 1875, a great deal need not be said; their immediate disruption the moment they arrive in the stomach, places them foremost in the ranks of adjuvants or vehicles for the administration of medicines, while their mode of dispensing makes them available for extemporaneous pharmacy, and makes them useful for physicians' prescription, not only for powders but pills as well, and as one gentleman suggested, even oils in drops can be thus administered, *e. g.*, Croton oil rubbed down with a few grains of sugar of milk can be better exhibited in this form than pills, and the physician is hereby liberated from the fixed form and formulas to which he has been hitherto bound, in order to disguise his medicaments, and present them in a palatable shape. Even children will take the small-size wafer without difficulty if properly given.

COVINGTON, KY.

ERGOTIN.*

BY CHARLES L. MITCHELL, PHILADELPHIA.

Under the above-named title a class of preparations have attracted considerable attention, as claiming to represent in a concentrated form the active principles of ergot. The title is an incorrect one, savoring rather of eclectic practice, for ergot owes its peculiar properties to the combined effect of a number of proximate constituents, and therefore the term of extract of ergot would be much more proper. There are several varieties of this article, but they can all be divided into two classes, represented respectively by Wiggers's and Bonjean's ergotins. Wiggers's ergotin is prepared by exhausting the ergot first with ether and then with alcohol, evaporating the liquids and washing with water, it remaining undissolved as a brownish oily liquid.†

Bonjean's ergotin is prepared by exhausting the ergot with water, precipitating the gum, etc., by the addition of alcohol, filtering and evaporating to an extract. This is the process recommended by the German Pharmacopœia. Dr. Squibb has also recommended a process for a concentrated preparation of ergot, under the name of Extract of Ergot, prepared by evaporating the fluid extract of ergot of the United States Pharmacopœia of 1860 to the consistence of a solid extract. The increasing use of ergot in late years, for the treatment of various hæmorrhagic diseases, in which it is necessary to produce contraction of the capillaries, and thus restrict the flood of blood to the diseased portion, renders it almost imperative that there should be a reliable concentrated preparation of this drug. This end has been partially reached in the officinal fluid extract of ergot, but for the hypodermic medication and topical administration of this remedy it is almost inapplicable, owing both to the quantity of alcohol it contains and to the amount of inert matter held in solution. A standard preparation is therefore desired for the latter purposes.

With the exception of Dr. Squibb's preparation and a few others, nearly all the ergotin and extract of ergot of the market is unreliable, owing to the want of proper care in the selection of the drug and mode of manufacture. The majority of them are made essentially by the process of Bonjean, Wiggers's ergotin having fallen nearly completely out of use.

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* Read at the Seventh Session.

† Wiggers' ergotin is a brown-red powder, soluble in alcohol, but insoluble in ether and water.—Editor.

In order to fully understand the difficulties which are to be encountered in producing this article, it will first be necessary to review briefly the chemical history of ergot up to the present date. The first results attained were by Wiggers, in 1830, who ascribed its activity to a principle extracted by ether and alcohol, which he called Ergotin. This was in no sense the active principle of the drug, but probably a mixture of fixed oil with the portion of the active constituents extracted by alcohol. His analysis was followed by Vauquelin, Wright, Legrip, and others. They all demonstrated the existence in large quantity of a fixed oil, to which the majority ascribed the virtues of the drug. Winckler next followed, who supposed that its peculiar power was owing to an alkaloid called Secalin, which existed naturally combined with the ergotin of Wiggers (to which he ascribed acid qualities), in the shape of ergotate of secalin. He also demonstrated the presence of trimethylamina. But in 1864 this theory was upset by Mr. Wenzell, of San Francisco, who claimed that ergot contained two alkaloids, ergotina and ecbolina, the latter having the effect on the uterus so characteristic of this drug. His theory has since been corroborated by a number of investigators. Now, quite recently, Professor Dragendorff and M. Padwissotsky announced that the active principles are a series of colloidal substances called Scleromucin, Sclerotic acid, Sclerethrin, etc., together with Wenzell's alkaloids. Of these sclerotic acid was successfully administered subcutaneously, while Wenzell's alkaloids were found inactive on the capillaries of frogs. *Au contraire*, Professor Buchheim, after repeated experiments, has come to the conclusion that the isolation of an active principle is almost impossible, owing to the low organization of the ergot fungus.

All these investigations only lead to the conclusion that ergot owes its activity, not to any special alkaloid or acid, but to the combined effects of a number of exceedingly unstable principles, very easily changed by chemical action, and of so complex a character as to render their determination not only extremely difficult, but almost impossible.

The only point, then, to be considered is a menstruum which shall abstract from the drug these principles in their natural state, and then to reduce them to a concentrated form.

The majority of the investigators on ergot have obtained their results from experiments made by exhausting the drug with either water or very weak alcohol. The ethereal and alcoholic extracts have been repeatedly shown to possess little or no activity in comparison with the aqueous. An aqueous menstruum would also seem to be indicated for ergot by the low character of its organization in the scale of vegetable life and large proportion of protein compounds.

An aqueous preparation, however, is extremely unstable, the various albuminous and colloid substances tending to hasten the change which always takes place in the presence of water.

But Professor Procter has shown, by his experiments, that the presence of a small quantity of acetic acid, not only fixed any alkaloidal constituents, but also greatly retarded the changes which would otherwise take place in all preparations of ergot. Bearing these points in mind, the writer has constructed the following formula for the preparation of a concentrated extract of ergot suitable for hypodermic use.

The formula is similar to Bonjean's, differing, however, in the important item of the use of acetic acid.

This preparation the writer designates as Concentrated Extract of Ergot. It is made as follows:

℞.—Best Powdered Ergot, ...	℥viij.
Acid Acetic, U. S. P., ...	f℥ij.
Alcohol, ...	f℥iv.
Water, ...	q. s.

Moisten the ergot with a mixture of the acetic acid and 8 fluid ounces water, and after standing 24 hours pack tightly in a percolator, and exhaust by pouring on water. Evaporate the percolate to 4 fluid ounces, add the alcohol, allow to stand several hours, filter, and evaporate to extract. In making large quantities the alcohol can be all recovered by distillation. Weight of extract, about 480 grains, 1 grain representing 8 grains ergot.

This extract possesses all the characteristics of a good preparation of ergot, and is perfectly adapted for hypodermic and topical use. It might be supposed by some that the acetic acid would render it irritant, but the excess of this is so thoroughly volatilized in the evaporation of the extract, as to render it perfectly bland.

As to its medical properties they have not yet been thoroughly tested; however, an article made by this formula was used for a number of months by the late Dr. Baker, resident physician at the hospital of the University of Pennsylvania, in his large hospital practice, with the most gratifying and complete success.

September 16th, 1876.

NOTE ON THE ADMINISTRATION OF PHOSPHORUS.*

BY EDWARD R. SQUIBB, M.D., OF BROOKLYN, N. Y.

It must now be admitted that phosphorus in its separate and elementary condition produces effects upon the animal economy which are not only different in degree, but also different in kind from the effects of phosphoric acid or any oxides of phosphorus. If the evidence for this statement does not yet amount to a demonstration, it is still entirely sufficient to justify the admission, and much too strong to be disregarded. The deductions from Wegner's† researches alone, which have not been discredited, nor much weakened by his opponents—and which are mainly the results of improved and closer investigation of points well studied by his predecessors—are quite strong enough to be received as established for the present time. Mr. J. Ashburton Thompson‡ gives useful testimony and much information upon the subject tending to the same conclusion. Indeed the entire drift of the medical literature of the past ten years has tended strongly in this direction, and has at the same time accumulated a large amount of important experience and information too voluminous even for abstract here. Lemaire, besides his own work, summarizes the observations of Béhier, Lecorché, Dujardin-Beaumetz, Desnos, etc., and an abstract of his conclusions is given in the "Bulletin Générale de Thérapeutique" for September, 1875. Any one who may desire to follow the subject up to the most recent conclusions will find a very numerous and instructive series of papers and abstracts in the journal just referred to, and in the London "Practitioner;" and a good bibliography at the end of Mr. J. Ashburton Thompson's book.

A very much condensed summary of the present state of the therapeutics of phosphorus may be useful here, even though very imperfect. A very brief synopsis of the conclusions of Lemaire and the French authorities who preceded him may be given with the remark that the French are eminently conservative in regard

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* Read at the Second Session.

† The Influence of Phosphorus on the Organism. An Experimental Study by George Wegner, Assistant of the Pathological Institute of Berlin. See Virchow's Archives for 1872, vol. lv, p. 11.

‡ Free Phosphorus in Medicine. By J. Ashburton Thompson, surgeon at King's Cross, etc. London, 1874. Published by H. K. Lewis, 136 Gower St., W. C.

to medications by phosphorus. Lemaire says, in substance, that in paralysis consecutive to acute diseases, or to "ataxo-adynamic" fevers; or in paralysis connected with alteration of the blood, as chloro-anæmia; or with diminution of the mass of blood, as from hæmorrhages, phosphorus has no special applicability. It is merely a tonic, or a stimulant of uncertain effect. Neither in cold paralysis, nor in hysterical paralysis, nor in that from cerebral softening, or from cerebral hæmorrhage, or from cerebral tumor, when these are to any considerable extent. But if the clot be small, and the disturbance in the brain-substance not too great, phosphorus seems to hasten the cure even when the paralysis may have continued for a year. And in case of syphilitic tumors it may hasten the cure after the specific treatment shall have been successfully used. In old paraplegias it is useless; but in those of recent occurrence which may be incomplete and not dependent upon profound lesion, it seems to have a favorable influence. In recent cases of progressive locomotor ataxy where the affection has not become general it appears to be useful, sometimes in ameliorating the symptoms, and in certain cases arresting the progress, but it never cures. In flashing or shooting (fulgurant) pains it is very uncertain; and in impotence is very variable in effect, seeming only to strengthen the patient. In sclerosis and in lead poisoning it is entirely useless, but seems useful in poisoning from bisulphuret of carbon and from mercury. Its use in muscular paralysis of the eye, in incomplete amaurosis, and in amblyopia is so uncertain as to need farther observation. In sterility it gives uncertain results, and when useful it is sometimes long after the medication. Phosphorus then seems to be a stimulant and a tonic to the nervous system, and to be capable of benefiting some of the more profound nervous affections which it cannot cure. It should be used in all such affections only after the acute symptoms have given place to the chronic condition, and all active irritation has disappeared, and never during inflammation, fever or cerebral excitement. This rule is absolute, and when disregarded the condition will be made worse, even to a fatal termination.*

The more effective applications of phosphorus seem to be to the functional derangements of the nervous system, which are of an adynamic character, or, where organic or structural changes are slight, are temporary in character, or are just commencing. Struc-

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* Bulletin Générale de Thérapeutique, September, 1875, T. lxxxix, F. 284.

tural changes which are preceded by functional disorder, or which produce functional disorder before the changes are fully established, and which are of a slowly progressive character, as, for example, those which arise from perverted nutrition, seem often to be within the entire control of phosphorus when skilfully applied.

But perhaps the most successful of all its applications is to that large class of cases wherein nervous power is used faster than the material for it is supplied, or to the condition which results in nervous exhaustion before the occurrence of serious structural change. Functional derangement is the effect of structural change as a cause. But structural changes differ in locality, in extent, in kind, and in degree. The remedial agency of phosphorus appears to apply most successfully to those changes which are general and not local, which affect the whole nervous system equably; changes of a kind which involve the relation of inferior supply to superior demand before the integrity of the tissues are seriously or profoundly invaded, or invaded to such a degree as to make retrogression very difficult. Tonic, sometimes to the extent of stimulation, and alterative from depressed conditions toward those of general health, it seems in the lower animals, at least, to have the special effect of increasing the gelatinous and bony structures (Wegner). It appears also to have a special therapeutic effect in some forms of neuralgia (Thompson). And in adynamic melancholia, in the nervous strain from overwork, and the nervous depression resulting from over-excitement. In this latter class of cases there appears to be nothing so generally successful in permanently but slowly relieving the prominent symptom of insomnia.

Phosphorus should be used with great caution, but not with timidity, and those who are afraid of it should let it alone rather than add to the large stock of so-called experience which has accumulated from imperfectly observed phenomena in its timid and unskilful application. It is dangerous only in the sense that all potent agencies are dangerous, because power to do good involves necessarily the same power for harm. The important peculiarity in regard to phosphorus, however, is that its poisonous effects from medicinal doses are remote, slow, and insidious; and when allowed to go to an extent which does not appear very grave, the condition is irremediable. It is, except in small doses, cumulative in its action; and as for some uses it is given in increasing quantities, it should be suspended for a few days at the end of ten or twelve days, and then be resumed in smaller dose and increased as at first with the same watchful care. At the very first appearance of the slightest gastric derangement, such as gastralgia, vomiting or diarrhœa, it should be suspended, and be either abandoned, or resumed in smaller doses with increased watchfulness. The necessity for care is in proportion to the dose. From $\frac{1}{100}$th to $\frac{1}{40}$th of a grain three or four times in the twenty-four hours may be given for weeks and months even, without any extraordinary care: and although such are the doses most frequently required and used, they are not large enough for some of its uses. Doses as large as $\frac{1}{8}$th of a grain have often been reached, but $\frac{1}{12}$th is considered to be about the largest safe dose, whilst $\frac{1}{20}$th to $\frac{1}{30}$th of a grain need rarely be exceeded in the most active treatment to which phosphorus is applicable. These doses apply to the substance when in solution in cod-liver oil, where it is in its most effective and most uniform condition for use. When used in the solid form, however finely divided, or however combined, much larger doses are generally tolerated, but explosion in the effects much more liable. Doses of phosphorus in the solid form up to 3 grains have often been given without serious consequences. But acute poisoning and death rapidly follow the ingestion of larger doses, and often occur from much smaller quantities down to half a grain, and this in divided doses. The general drift of the best observations seems to show that the use of phosphorus in the solid form should be abandoned, because the dose has to be larger, and the results are uncertain and treacherous, because more or less of the solid substance may be dissolved in the primæ viæ, or more or less may pass off in an inactive condition, according to the condition of the stomach and the character of its secretions and its contents at the time of administration. In Continental Europe the common dose to begin with is a milligram, equal to $\frac{1}{65}$th of a grain, and this is given three to five times daily, and increased to say 5 milligrams, equal to $\frac{1}{14}$th of a grain. The dose and effects of phosphorus differ very much with the form in which it is given, and the causes of this have not been satisfactory investigated. It seems to have been pretty clearly shown by Devergie, Solon, and Thompson, that its solution in vegetable oils is liable to develop poisonous properties, which render these variable and unsafe; and it is supposed that this is due to the formation of hypophosphorous acid, by a reaction between the phosphorus and certain elements of the oils, under the influence of light, air, and moisture. And even the method by superheating the oils before using them as solvents does not seem to render them unobjectionable. This excludes olive and almond oils, cacao butter, etc.

Solution in alcohol, ether, chloroform, carbon disulphide, etc., though very easily made, are variable and constantly changing by reason of the volatility of the solvent, even though glycerin be added, while the pungency of the liquids, and the impossibility of diluting them with less pungent liquids without precipitating the phosphorus, renders them difficult to administer. When such solutions are evaporated off in the formation of pills from them, oxidation of the phosphorus is unavoidable, and the lower poisonous oxide most likely to be formed. Beside, pills made by evaporation of the solvent have the disadvantages of those made from the subdivision of the solid phosphorus. A solution in resin is not very difficult to make, and affords a dry powder which may be dispensed easily, with the desired accuracy. But it is doubtful whether the same chemical change does not occur here that is known to occur with oil of turpentine, rendering the phosphorus comparatively inert. Beside, the resin is more or less difficult of solution in the stomach, and may, under conditions which are not improbable, carry the phosphorus through the alimentary canal without effect. Zinc phosphide, which at first appeared to offer a means of medication equal to free phosphorus, has not confirmed the expectations from it, while it is very difficult to make and control, difficult to know when well made or not, difficult to keep, and sometimes dangerous. From all that has been written upon the subject it seems to be pretty well established that phosphorus should only be given in solution, and that the solvent used should be bland and not volatile, and should be capable of protecting the substance from oxidation for a reasonable length of time when kept from light and air. Such a solvent has been found in cod-liver oil, and the testimony in regard to the solution in cod-liver oil is, up to this time, so favorable as to indicate that all other preparations should be abandoned. It is, therefore, the object of this note to show that a definite uniform solution of phosphorus in cod-liver oil may be easily made and easily managed, so as to give an opportunity to the physician and pharmacist to use it with great accuracy and safety by ordinary extemporaneous prescription, allowing the physician to change his dose and mode of administration as each case may require in its different conditions and stages. This should put medication by free phosphorus under the same conditions for accurate administration and accurate observation with other potent remedies, and would enable physicians sooner to determine its true position and more accurate value in the materia medica by bringing it within their entire control and responsibility.

It is so very difficult to prevent phosphorus from oxidation when in contact with substances containing oxygen, and when in contact with substances which contain no oxygen so difficult to prevent its combination with other elements which impair or destroy its activity, that it is not easy to understand how it can ever reach the circulating fluids of the body as free or uncombined phosphorus. Yet that it does so seems now pretty well established; and if it does so, a solution under the protective agency of a combination with oil-globules which, by emulsion in the intestinal tract, pass into the chyle, is the most rational. Whether its ultimate effect in the tissues be as phosphorus, or as phosphoric acid, must still be very doubtful, when it is remembered that before reaching the tissues it is aerated in the lungs. That "phosphorus can never be effectively employed but in its free and most active state" (Thompson, p. 9) is abundantly disproved by the experience of this country, and especially by the systematic observations in large hospitals for the insane (See especially a paper on "The Physiological Action and Therapeutic Uses of the Acidum Phosphoricum Dilutum, by Judson B. Andrews, M.D., Assistant Physician in the New York State Lunatic Asylum," published in the "American Journal of Insanity" for October, 1869).

In regard to the specific action of phosphorus upon the bones, Wegner says: "For the therapeutic application it is in general more advisable to make use of the phosphorus in substance than the phosphorous or phosphoric acids. If any considerable action is to be developed by the two latter preparations they must be used in doses which, in animals at least, disturb the digestive apparatus to a high degree."

The officinal (U. S. P.) dilute phosphoric acid is very efficient in doses of 20 ♏ = 1.25 c.c. to 30 ♏ = 1.875 c.c., given three times a day. Such doses contain, the first about 0.65 gr. = 45 milligrams, the second about 0.98 gr. = 68 milligrams, of phosphorus. The equivalent doses of uncombined or free phosphorus would be about $\frac{1}{60}$th to $\frac{1}{40}$th = 1 to 1$\frac{1}{3}$d milligrams. Therefore the quantity of phosphorus given in the condition of phosphoric acid is nearly fifty times greater than when given as free phosphorus, to produce an equivalent therapeutic effect—provided the effect be the same—and not eight hundred to one thousand times greater, as in Wegner's experiments on the lower animals to obtain his effects upon the bony tissues. This part of the subject is much in need of closer investigation, and it is hoped that Dr. Andrews, or some other careful observer who may be equally familiar with the uses and effects of phosphoric acid, will compare it with free phosphorus and give the results to the profession, when some means of accurate dosing of free phosphorus is afforded, as by the object of this note.

Referring, then, to the numerous authorities for what has been written on the subject of the effects and modes of administration of free phosphorus, it is here proposed to dismiss all the formulas for its administration except that which up to this time may be conceded to be the best, namely, its solution in cod-liver oil, and to so formulate and elaborate this mode of administration that it may afford a safe and uniform practice as a basis for more accurate observation, and a more exact experience, and may enable the physician to prescribe and pharmacist to dispense the substance accurately and conveniently in any dose, as with other articles of the materia medica, the object being to get the phosphorus into the stomach without oxidation, and yet in a condition to be all readily absorbed and active. A secondary object is to administer it in such a variety of forms as may adapt it to different conditions of stomach and palate, and render it as little disagreeable as may be consistent with the primary object of keeping it free from oxidation and active.

Solution of Phosphorus.

Take of Phosphorus, well dried, ...	1 part.
Cod-liver Oil, ...	99 parts.

Put the cod-liver oil in a bottle which will be about three-fourths filled by it. Fit two corks to the bottle, set one aside and fit the other with two small glass tubes, one short and the other to reach to very near the surface of the oil when the cork is in the neck of the bottle. Then pass a current of dry carbonic acid (carbon dioxide) into the bottle, through the longer tube, for about fifteen minutes or until the air is all driven out and replaced by the gas. Counterbalance a vessel of water on a good scale, and weigh into it the phosphorus, which has been cut into as large and as few pieces as possible, under water, in another shallow vessel, having one or two small pieces of phosphorus in excess of the exact weight required. Then put ice into the water with the weighed phosphorus, and set it aside for half an hour. Next, counterbalance a dry capsule and add to the counterbalance the exact weight of phosphorus required. Chill the capsule well by immersion in ice-water, dry it, and replace it on the scale. Then take the pieces of chilled phosphorus from the ice-water, one at a time, dry them rapidly with a soft absorbent towel, or with good bibulous paper, and place them in the chilled capsule on the scale until the exact weight of dry phosphorus is obtained. Then remove the perforated cork from the bottle, drop the pieces of dry phosphorus rapidly into the oil, and put in the unperforated cork which had been fitted and set aside. Set the bottle in tepid water and warm the water until the phosphorus melts, and shake the mixture until the phosphorus is entirely dissolved, keeping it at about the same temperature till the solution is effected. Remove the longer tube from the perforated cork and replace it with a siphon, the short leg of which shall reach to the bottom of the bottle, and then replace the cork in the bottle of solution. Connect the india-rubber tube of the self-regulating reservoir of carbon dioxide to the short tube of the cork, and put the pressure of the reservoir on to the bottle. Fit the end of the long leg of the siphon with a short piece of india-rubber tubing, and the other end of this tubing with a piece of small glass tubing about 2 inches (= 5 centimetres) long, and put a pinchcock upon the india-rubber tubing, the bottle being placed upon a stand some 6 inches (= 15 centimetres) high. Then carefully open the pinchcock and suck over the solution so as to fill the long leg of the siphon. Finally, by means of the siphon and pinchcock, fill the solution into dry ground-stoppered bottles of not more than one fluid ounce (= 30 cubic centimetres) capacity, allowing the carbon dioxide to fill the bottle from the drying apparatus of the reservoir as the solution is drawn out. In filling the bottles the glass tube should pass to the bottom and the bottles be filled as full as is safe, leaving the least practicable room for air, and they should be at once tightly stoppered and be kept in a cool, dark place. The writer has found no way of avoiding oxidation and the formation of a pellicle, except by the use of carbon dioxide as above described, and no better way of accurately weighing and drying the phosphorus than that described. In all attempts to do without chilling some fragment or the whole took fire before it could be properly dried and got into the oil.

This solution of phosphorus has the sensible properties of the cod-liver oil from which it is made, except that a slight odor of phosphorus is superadded, and the oil should be as limped, as bland,

and as free from odor and taste as possible, and must be entirely free from rancidity. When exposed to the air it emits white vapor in small amount, and becomes covered with a dark-brown pellicle. This pellicle protects the oil below it from rapid change. In dispensing the solutiom from a one-ounce bottle this pellicle forms after the first portion has been taken out, and increases in quantity to the last. It generally adheres to the sides of the vial, the oil from below breaking through it at each dispensing. No part of the pellicle should ever be dispensed. Nor should the last half drachm of the vial be used. The solution should be dispensed and the dose be calculated always by weight. It is a one per cent. solution and therefore each 100 grains contain 1 grain of free phosphorus.

Each minim weighs 0.88, or seven-eighths of a grain, and therefore represents 0.0088 grain of phosphorus.

This solution might perhaps be improved by previously decolorizing and deodorizing the cod-liver oil by filtration through carefully prepared animal charcoal; and also perhaps by adding to the oil say one-twenty-fifth of its weight of stronger ether, to give an atmosphere of ether vapor in the dispensing bottle for protection against air and oxidation. The writer has not had time to try these, but should they prove practically advantageous he intends to adopt them in the preparation.

ADMINISTRATION OF THE SOLUTION.

Perhaps the best and most simple means of giving the solution is by a further definite dilution with cod-liver oil. If, as is not unfrequently the case, small doses of phosphorus are indicated in conditions which require cod-liver oil; or in cases primarily needing phosphorus wherein cod-liver oil would be a useful adjuvant, the following dilutions would be convenient:

Counterbalance a bottle containing a pint of cod-liver oil, and then pour into the oil 64 grains or 4 grams of the solution. This gives a dilution containing about $\frac{1}{50}$th of a grain or $1\frac{1}{3}$d milligrams of phosphorus in each half fluid ounce or 15 c.c. of the mixture. A dose of two fluidrachms or $7\frac{1}{2}$ c.c. of this dilution, representing $\frac{1}{100}$th grain of phosphorus, given immediately after each meal, is very effective, and not very liable to interfere with digestion.

Four fluidounces of cod-liver oil weigh about 1700 grains or 110 grams. If to this be added 64 grains or 4 grams of the solution, each fluidrachm of the mixture represents $\frac{1}{50}$th grain or $1\frac{1}{3}$d milligrams of phosphorus. One, two, three, and four fluidrachms of this dilution severally represent the range of doses in which phosphorus is required, namely: $\frac{1}{50}$th, $\frac{1}{25}$th, $\frac{1}{16}$th, and $\frac{1}{12}$th, grain, when active medication by phosphorus is indicated.

Mr. George C. Close, an able pharmacist of Brooklyn, makes an admirable emulsion of cod-liver oil, which is quite well adapted to either of these dilutions. The writer is indebted to Mr. Close for the following formulas and directions, which will be found very useful. The formula for an emulsion of cod-liver oil simply is as follows:

Take of Cod-liver Oil, . . . 4f℥ = 1700 gr. = 120 c.c. = 110 grams.
Glyconin, . . . 9ʒ = 540 gr. = 35 grams.
Aromatic Spirit of Ammonia, 1ʒ = 4 grams.
Sherry Wine, . . . 20ʒ = 77.76 grams.
Tincture or Essence of Bitter Almonds.
(1 part Oil of Bitter Almonds to 64 parts Alcohol), 2ʒ = 7.78 grams.

Put the glyconin in a mortar and add the oil to it very slowly, triturating the mixture actively and constantly. The success of the emulsion depends upon the skill with which the first small portion of the oil is rubbed up with the glyconin, therefore the oil must be added in very small quantity and very slowly at first. After the oil is all in, add the other ingredients in the order in which they are named. In the large and successful use of this emulsion half an ounce of the Sherry wine has often, if not commonly been omitted, and the same quantity of diluted phosphoric acid substituted. The dose of this emulsion is from a dessertspoonful to a tablespoonful. Jamaica rum or brandy may be substituted for the Sherry wine when preferred. Of all modes of giving cod-liver oil this is perhaps the least objectionable to most persons.

In using this formula as a vehicle for giving free phosphorus, the solution of phosphorus is made a part of the cod-liver oil. For example, take half the quantities of the formula, and for this four fluidounce emulsion take 770 grains of cod-liver oil, and 80 grains of solution of phosphorus. Then a teaspoonful dose will represent $\frac{1}{40}$th grain of free phosphorus. Thompson says that oil of peppermint covers the taste of free phosphorus better than anything tried by him.

The glyconin which is so useful in emulsifying oils is made as follows:

Take of the yolks of eggs, carefully excluding the white, four parts; glycerin, concentrated and odorless, five parts. Beat or whip well the yolks of eggs in the usual manner, and pour the liquid into a bottle, add the glycerin and shake them well together.

This glyconin keeps well for an indefinite length of time. It was introduced from French pharmacy many years ago, and as an emulsifying agent and preservative of emulsions, deserves to be better known. Emulsions made with it by ordinary skill and according to the above given directions, never separate. If they separate it is for want of proper care in the commencement of introduction of the oil.

This solution of phosphorus may also be given in the form of a pill; and whether in pill, or in the powder to be mentioned hereafter, it is always as a solution that it is given, since the solvent does not evaporate but remains to hold and protect the phosphorus. The formula for pills is as follows:

Take of the

Solution of Phosphorus, Magnesia, Powdered Soap, of each,	1 part.
Stronger Ether, ...	2 parts.

Weigh the magnesia, powdered soap, and stronger ether in this order into a counterbalanced mortar. Stir the mixture until the powders are thoroughly wetted with the ether; make up the weight again by a little stronger ether to compensate the loss by stirring, and then weigh in the solution of phosphorus. Rub the whole together until the ether has all evaporated, and then divide the mass into pills, whose size shall be adapted to the dose of free phosphorus required. Dispense the pills in a vial into which a drop or two of ether has been dropped, to furnish an atmosphere of ether vapor for the better protection of the pills, and if any powder be used let it be magnesia. The pills should not be made in large quantity, nor be kept longer than a few weeks, as it is impossible to know how long the phosphorus will remain in a free state under the varying conditions to which such pills are subjected.

If the ingredients of the formula be taken so that each part represents 100 grains, that is, 100 grains each of the solution, magnesia, and powdered soap, and 200 grains of stronger ether; and if the mass be then divided into 100 pills, each pill will contain the $\frac{1}{100}$th of a grain of phosphorus, which would be the smallest usual dose. Such doses, taken three times a day, would require 33 days to use the 100 pills, and this is probably quite as long as they should be kept. The more common dose is $\frac{1}{50}$th of a grain, and then two pills would be taken at a dose, and the prescription would last 17 days, and the pills would more surely remain in a proper condition.

Such pills, if it be desirable, may be dipped in a warm solution of 1 part gelatin in 16 parts water, and be dried in the usual way;

and although this covers the odor of phosphorus, it is doubtful whether the coating is of much use as a protection against change.

The use of the ether in this formula is to drive out the air occluded in the powders, and supply its place with a substance which will not oxidize the phosphorus; and if the formula be properly managed no white vapors are seen during the manipulation, nor in the vial in which the pills are kept, whether the pills be coated or not. As an experiment, a mass made as above directed was left exposed in the mortar for 48 hours without apparent change of color, and without visible vapor, and the writer then took many doses of the pills made from it without eructations, or other digestive disturbance, the dose being $\frac{1}{33}$d of a grain of phosphorus.

These pills are not luminous when broken open in the dark, because the oil protects the phosphorus from oxidation as well in the pill as in the bottle. The value of this common test for phosphorus pills is much overrated, since the shining in the dark shows oxidation of the phosphorus rather than protection, and a broken pill which does not shine in the dark may be either devoid of free phosphorus or may have it present in full proportion, but protected against oxidation. Again, the change which takes place in a broken pill may occur more slowly in an unbroken one.

This solution of phosphorus may also be given in capsules, and this method of giving it would be convenient and easy if it was practicable to get capsules, any large proportion of which were perfect enough to hold liquids. As a fact, however, they are so imperfectly made, as now sold, that but a very small proportion of them can be used for liquids, unless the plan of doubling the capsule be adopted by slipping one size moistened with water into the next larger size.

In dispensing this solution in capsules, the capsules can be conveniently and accurately filled by means of a 60 minim pipette, or by a cubic centimetre pipette. The pipette fitted at the lower end by a piece of india-rubber tubing, and a piece of glass tubing drawn to a small orifice, with a pinch-cock upon the rubber portion. The upper end of the pipette is furnished with a piece of india-rubber tubing for suction. The whole being held upright in any convenient stand, the bottle is held so that the fine point dips into the solution. The pinch-cock being held open the solution is sucked into the pipette up to the top of the graduation, and the pinch-cock then closed. Then, by means of the pinch-cock, one or more minims may be drawn into each capsule. As each capsule is filled the edge of the cover is dipped into water before being put on. This seals the body and cover together, so that no leakage ever occurs at that point.

Another way in which the solution is accurately, conveniently, and easily dispensed, is in the form of a moist powder.

If the solution be dropped upon any dry powder, and be rubbed up therewith, the air which the powder contains very rapidly oxidizes the phosphorus, as is shown by the copious white vapor given off, and by change in color of the powder. But if the air be first driven out of the powder, the solution may be incorporated without light or vapor or change of color,—the unmistakable signs of oxidation. This interstitial air is best driven out by ether. And the powders best adapted to the purpose are precipitated calcium carbonate, or precipitated calcium phosphate.

Counterbalance a one-ounce, wide-mouth bottle, fitted with a good cork, and weigh into it 140 grains = 9.1 grams each of calcium carbonate and stronger ether. Cork the bottle, shake it, and then add 50 grains = 3.24 grams of solution of phosphorus. Again cork the bottle, and having shaken well, empty the contents into a mortar, and shake out all that can be shaken from the bottle into the mortar. Allow the bottle to stand uncorked, that a portion of the ether may evaporate off. Triturate the contents of the mortar until nearly all the ether has evaporated, and a damp powder remains. At the very first sign of white vapor, or before any vapor occurs, transfer the damp powder by means of a spatula back to the bottle, cork and shake it well, and then weigh it. The whole contents of the bottle should now weigh about 200 grains = 12.96 grams, that is, 140 parts calcium carbonate, 50 parts solution of phosphorus, and 10 parts ether, and this contains $\frac{1}{2}$ a part of phosphorus. Of this powder 10 grains is equal to $\frac{1}{40}$th grain of phosphorus, 8 grains equal to $\frac{1}{50}$th, and so on. This powder may be put into capsules, or better, into cachets or wafers, thus affording a good method of administration to those who particularly dislike the odor and taste of cod-liver oil. This powder appears to keep pretty well, that shown herewith having been made nearly a month. The portion made with calcium phosphate has, however, changed color within the past two weeks. From being quite white it now has a brownish tinge, a sure indication of change. As the powders are not intended to be kept, but must be made for each prescription, this is a matter of small importance. About twenty minutes of time is required to make the powder properly, and the pharmacist will not be likely to succeed well the first trial. But when successfully done it will be found an excellent method of giving free phosphorus. Both powders, but especially the calcium carbonate, have a tendency to combine with and neutralize any small proportions of the various oxides of phosphorus that may form, and this is the reason for selecting these powders. Organic powders do not answer.

There are many patients whose stomachs will not tolerate free phosphorus in any form, and a few that accept it for a few days only; and much harm is often done by pushing it in such cases. If commenced in small doses, and never given on an empty stomach, but always after a meal, it then disagrees, either by producing eructations to an injurious extent, or by interfering seriously with digestion, it should be abandoned, and be substituted by phosphoric acid; and this is no doubt the better agent for phosphorus medication in a large class of cases.

There are many patients, also, that cannot tolerate cod-liver oil even in the smallest quantity. Such, too, had better be treated by phosphoric acid, for it has been pretty clearly shown that the solutions in vegetable oils, even when the oils are superheated beforehand, as well as the solutions in alcohol, ether, chloroform, carbon disulphide, etc., or in mixtures of these with or without glycerin,—are liable to such changes as always to prevent accuracy in medication, and often to produce toxic effects. Even the solution in cod-liver oil has as yet not been tried long enough, nor with sufficient care and accuracy in its preparation or administration, to justify the statements made in regard to it, and it is the object of this paper to place this solution under known conditions, favorable to accurate use and observation.

BROOKLYN, August, 1876.

LIQUOR FERRI CHLORIDI DILUTUS.*

BY M. S. BIDWELL.

QUERY 31.—What advantage is there in retaining alcohol in tinctura ferri chloridi? Would it be desirable to introduce liquor ferri chloridi dilutus, of the same iron strength, in place of the tincture?

To answer this double question intelligently involves at least three distinct considerations, viz.:

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* Read at the Sixth Session.

1. Would the proposed solution be a good preparation pharmaceutically, that is, would it look well? Would it keep? Would it mix well with the fluids most frequently combined with the tincture? and the like.

2. Would it be a good preparation therapeutically? How would its action differ from that of the tincture? Would it be better or worse; or would it, without taking the place of the tincture, be a useful addition to the physician's resources?

3. Supposing both these questions to be answered favorably, and the preparation to be made officinal, would physicians in general use it? or would it remain, like tinctura cardamomi or tinctura cinchonæ, a nice way of filling up the Pharmacopœia, seldom if ever used, and known only to the pharmaceutical student.

Before considering these questions, it may not be amiss to give a few moments to the mode of preparing the present tincture, so much used, both in professional and domestic medicine. This is now made in both the United States and British Pharmacopœias, from a strong solution of ferri chloridum, or sesquichloride of iron, which is called in our Pharmacopœia simply liquor ferri chloridi, and in the British liquor ferri perchloridi fortior. From this the tincture is made by adding three times its bulk of alcohol. The process is substantially the same as that adopted in the United States Pharmacopœia of 1860, differing only in making the liquor a separate preparation with a distinct name. The tincture thus prepared contains ferric chloride, free nitric and hydrochloric acids, water, alcohol, and a minute quantity of an ether, resulting from the action of the acids on the alcohol. This ether is in variable amount, too small to be estimated, but recognizable by the smell, and has been rather vaguely thought to be the source of the diuretic properties ascribed to the tincture.

From the same strong solution the British Pharmacopœia makes its officinal "liquor ferri perchloridi," by adding water instead of alcohol. Thus the proposed preparation is already established in the United Kingdom.

Returning now and taking up the questions in order, the first may be answered by the pharmacist with tolerable certainty. The proposed solution would be at least equal to the tincture in appearance and in permanence, being distinguished from it only by its somewhat lighter color and by the absence of the alcoholic and (slight) ethereal flavors. With reference to its eligibility in combination, the first thought of the practitioner or pharmacist will probably be that the tincture is very seldom combined, its harsh acid taste, as well as its tendency to blacken with vegetable astringents, making it an undesirable ingredient in a mixture. In the few combinations into which it enters, the solution would generally answer just as well. The result of an examination of Ellis's "Formulary" may be mentioned to illustrate both these points. Out of over one thousand recipes contained in that work, but eight were found to have the tincture as an ingredient, and in all but one of these the solution would perfectly replace it. The possible exception was a mixture of tincture of iron, tincture of aloes and myrrh, and tincture of castor, in which the myrrh might be partly precipitated if the solution were substituted for the tincture. This combination not seeming likely to be much used, it was not thought worth while to make the experiment. In the private recipe book used in the writer's pharmacy, out of one hundred and thirteen formulas but one contains the tincture, and in this the solution answers just as well. Of course these numbers (9 in 1100) do not indicate at all the frequency with which the tincture is used, but only the infrequency with which it is used *in combination.*

Pharmaceutically, then, the proposed solution would be desirable, and would have the advantage of economy, in dispensing with the use of alcohol at its present high price.

The question of therapeutic efficiency could be perfectly determined only by long and impartial trial. The effects of a tonic are usually so slow as to be almost imperceptible, and medicines of this kind being generally used in connection with other hygienic means, a favorable result can seldom be attributed with certainty to any one agent. The effect of an emetic or cathartic is positive, immediate, and unmistakable, and a few trials determine its relative efficiency; a tonic can establish its reputation only by extended and long-continued experience. Yet in this case the effect of each ingredient is so well known that an estimate of the relative value of the two preparations can be made intelligently, if not with perfect certainty. The only points of difference between them are the alcohol and the incidentally present ether. Of the former it is safe to say that in the small doses given it could not have much effect, that its effect would not always be desirable, and that when the physician wishes to use alcohol, it would be simpler and safer to add it directly and definitely rather than to give it incidentally, and as it were unconsciously. This last statement applies with equal force to the other, with the further remark that the amount of this is so small and so variable that it can hardly be recognized as a factor in estimating the value of a preparation.

If, then, the proposed liquor ferri chloridi would be desirable pharmaceutically and therapeutically, would it be well to give it a place in the Pharmacopœia? The answer to this lies beyond the province of pharmacy. In the preparation of our national standard it is the business of the physicians to indicate what preparations they wish for their use; it is the part of the chemist and pharmacist to devise the formulas and prepare them. No attempt will therefore be made to answer this question, except in the most general manner. Any new form of an old remedy is adopted very slowly by the profession, and this is peculiarly the case with tonics, for reasons already mentioned. If the proposed solution were included in the next revision of the Pharmacopœia, issued perhaps about 1883, it seems likely that the year 1900 would see more prescriptions for "tinct. ferri muriatica" than for "liquor ferri chloridi dilutus," and would find many physicians ignorant of the existence of the latter. It must be remembered that a medicament is not brought to the notice of the profession by adoption in the Pharmacopœia, a work which comparatively few physicians ever see. It is only when it gets into the Dispensatory, some years later, that it begins to reach them, and even then only those who buy a new edition of that rather expensive work.

To recapitulate, there is no advantage in retaining alcohol in the preparation, save that it enables it still to be called tincture. The proposed liquor would be a good thing pharmaceutically and therapeutically, but the question whether it would be used by physicians can be answered only by them. The probability of its usefulness, however, is not sufficient to warrant its introduction into the Pharmacopœia, unless distinctly called for by the medical profession. The question has been submitted by the writer to a number of physicians, including a very intelligent medical society, and their opinion was almost unanimously unfavorable to any such novelty.

Considering all these things, it would seem better, instead of introducing a new preparation, to modify the tincture, by using dilute instead of strong alcohol in making it, thus reducing its alcoholic strength one-half. All the considerations adduced in favor of the proposed solution would apply to this change; while one possible source of confusion, by the introduction of a new preparation under an old name, or of different solutions having the same name in our own and the British Pharmacopœias, would be avoided.

ON CINNAMON WATER.[*]

BY EDWARD C. JONES.

QUERY 17.—Is the oil of Ceylon Cinnamon used in the preparation of Cinnamon Water of the United States Pharmacopœia?

IN answer to this query, I would say that very few druggists make it according to the officinal formula, which is as follows: Take of oil of Ceylon cinnamon, f℥ss.; carb. magnesia, 60 grains; distilled water, Oij; rub the oil first with carb. magnesia, and then gradually add the water, and filter. This has a very mild, pleasant odor, and sweetish and agreeable taste; but they prefer the oil of cassia, which goes under the commercial name of oil of cinnamon. Made of the same strength, this has a more pungent and less sweetish taste. As it is used as a vehicle for more disagreeable medicines, and in the strength of two drops to each fluid ounce, it does not seem so important, but still it is very desirable that all should follow the officinal formula.

Very few druggists keep the oil of Ceylon cinnamon in the shop, on account of the oil of cassia going under the commercial name of cinnamon, and also on account of its price, which is $2.50 per ounce to the other $1.50 per pound. We have always made *ours* accordingly of oil of cassia, and it generally gave satisfaction.

ON EMULSIONS.[†]

BY EDMUND GREGORY, LINDSAY, ONT.

QUERY 39.—How much acacia is needed to emulsify perfectly the fixed or volatile oils and balsams?

THERE exists so much difference of opinion as to the comparative success of various methods for producing emulsions, that it gives rise to a suspicion there may be an equal difference in the estimate of what qualities are essential to the constitution of a

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[*] Read at the Seventh Session.

[†] Read at the Sixth Session.

perfect emulsion. Hence the necessity of a fixed standard of excellence. Such a standard we find in the milk of the cow. An emulsion, then, should be white as milk, and should have its fat-globules too small to be visible to the unassisted eye, and so well suspended that, although on standing a cream-like layer may rise to the top, it will readily reunite on shaking. Adopting this standard the writer will endeavor to enumerate the various methods proposed for making emulsions, and to give the results of actual experiment. Considering oil of turpentine as a fair type of the volatile oils, and that they are the most difficult class of substances to operate with, researches have been mostly confined to that drug. Premising these remarks, I proceed to consider:

1. The method which directs that equal parts of mucilage of acacia and oil should be put into a bottle and well shaken together, the requisite quantity of water being gradually added. If the mucilage be fresh, the bottle only partially full, and the shaking very vigorous, tolerable results can be obtained with castor oil, moderate results with balsam copaiba, and with oil of turpentine a total failure. But in all cases the oil-globules are distinctly visible to the naked eye.

2. Equal parts of oil and mucilage are put into a mortar together, and briskly triturated.

This gives barely tolerable results with the balsams and thicker oils, but with oil of turpentine it is a total failure, no amount of labor producing the slightest effect.

3. Equal parts of oil and mucilage, the oil to be gradually added, triturating briskly after each addition until the portion added is emulsified.

A fair result can be obtained by this process if the operator have plenty of patience and a liberal supply of muscle, but the product is too dark in color. The oil-globules are not visible to the naked eye, but can be easily seen with a magnifying power of three diameters. It separates into two layers in two and a half hours, the lower layer being dark but not watery.

4. The next process is that wherein equal parts of mucilage, water, and oil are put into a suitable vessel, and agitated with an egg-beater until emulsionized.

This yields a tolerable result, is simple, and requires no skill, but is rather laborious, and yields a product very dark in color. The oil-globules are not visible to the naked eye, but quite distinctly under a power of three diameters. It separates into two layers in three hours, the lower layer being very watery.

5. The next process tried was that of Mr. Charles F. Hartwig (published in the Pharmacist, October, 1875), in which one part of mucilage and one part of water are put into a suitable vessel, thoroughly mixed by being drawn up into and ejected from a small vaginal syringe, and one part of oil having been added, the emulsion is produced by the use of the syringe alone in the same way.

This process yields excellent results, but the emulsion is not quite as white as it should be; the process is rather tedious and the after-cleaning very troublesome. It is the best of the processes in which officinal mucilage is employed. The oil-globules are invisible to the naked eye, but are distinctly seen with a power of three diameters. It separates into two layers in twenty hours, the lower layer being milky in appearance.

6. A process, published in the "Journal of Pharmacy" in February, 1872, by Mr. J. Winchell Forbes, and apparently designed more especially for oil of turpentine, in which he directs that one part of oil shall be put into a bottle and shaken, then one-eighth part of pulverized acacia, and after thorough agitation half a part of water added, the whole to be then vigorously shaken until emulsified.

The resulting emulsion is deficient in whiteness. The oil-globules are distinctly visible, as a multitude of gem-like points, under a magnifying power of three diameters, and are also visible to the naked eye if a drop be placed on a plate of glass and held up between the eye and the light. It separates into two distinct layers in fifteen minutes, the lower layer being quite watery, but it easily reunites on shaking.

7. If, however, in the preceding process, three-eighths of a part of pulverized acacia be used instead of one-eighth, a very good result is obtained, the product being much whiter, the oil-globules about half the size, and quite invisible to the naked eye. It now takes twelve hours to separate into two layers, the lower layer, however, being still watery.

8. The next process for consideration is described on page 343 of Mohr and Redwood's Pharmacy, English edition of 1849, in which one part of pulverized acacia and one and a half parts of water are put into a mortar, and after thorough trituration three parts of oil are added gradually, each separate portion being emulsified before another is added.

The results are admirable, the product being white as milk. The oil-globules are not visible to the naked eye, but slightly so under a power of three diameters, and it does not separate into two layers under twenty-four hours, the lower layer having the appearance of milk.

9. The last process which will be referred to is recommended by Mr. Hans M. Wilder, in the "Druggist's Circular" for December, 1874. One part of pulverized acacia and two parts of oil are put into a mortar and rubbed together; one and a half parts of water are then added at once, and with a few revolutions of the pestle the whole is emulsified.

It has yielded in my hands the very best results. The emulsion is beautifully white, scarcely to be distinguished from milk, and the necessary manipulations are very speedy and simple. The oil-globules are totally invisible to the naked eye, and not very perceptible with a power of three diameters. It separates into two layers in twenty-four hours, the lower layer being quite like milk, whilst the upper would pass for cream, and at the time of writing this, four days after making, retains the same appearance, and is by far the best out of six samples that are standing undisturbed before the writer.

In summing up results, the conclusion must be arrived at that those who desire an unexceptionable emulsion must abandon those processes in which officinal mucilage is used, and adopt one which calls for pulverized acacia. Any inquirer, who will take the pains to prepare a series of emulsions according to the formulas given above, and will set the bottles in a row before him, will in a few hours receive a very striking lesson. Of these, the process No. 9, of Hager and Mohr, noticed by Mr. Hans M. Wilder, is the quickest, is simple, demands no apparatus that does not exist in every pharmacy, and yields unexceptionable results. Next to this comes process No. 8, taken from Mohr and Redwood's Pharmacy, which yields an admirable product, but is a little more tedious than the preceding. No. 7, Mr. Winchell's process improved, is admissible when a pestle and mortar cannot readily be obtained from any accidental cause, but it will scarcely succeed with the more viscid oils or balsams, such as castor oil or balsam copaiba. Of the processes using officinal mucilage, the only one yielding a good result is that of Mr. Hartwig, No. 5, in which the vaginal syringe is used.

In answer, then, to the query at the head of this paper, the writer would say, that three drachms of acacia in fine powder are necessary to emulsify one ounce of any of the volatile oils, and that a little less (about two drachms) will answer for the fixed oils and balsams. And that to this quantity of gum four drachms and a half of water must be added (no more and no less), and that either the water or the oil may be added first to the gum, but it is quickest to add the oil first, and well triturate before adding the water. Less gum can be made to yield a good result by a careful operator, but as a general practical working rule it may be said that three drachms are necessary for one ounce of oil.

DEODORIZED TINCTURE OF OPIUM.*

BY J. D. O'DONNELL.

The formula for making the above preparation seeming to me unnecessarily prolix, I concluded some time since to try if the same could not be made by percolation. Accordingly I mixed the powdered opium with an equal bulk of white sand, such as is used by plasterers in the last or white coat, and gradually adding water rubbed the mixture until a smooth thick paste was formed, which I transferred to a percolator, rinsing out the mortar with water and adding to the paste. In this connection I would say that I prefer, to a plug of cotton or sponge in the neck of the percolator, a perforated convex diaphragm resting, convex side up, on the bottom of the percolator; a plug of any kind making the operation of percolating opium with either water or dilute alcohol a very tedious process.

Adding water sufficient to obtain the desired amount of percolate, I found that the last was a pale straw color, almost devoid of taste and odor. From this I necessarily concluded that the process was a success, and have since followed it; a perfect preparation always being obtained. I can see no reason why it should result differently in other hands. It has the recommendation of being rapid and cleanly, two very important considerations.

After having evaporated the aqueous tincture to the proper quantity, I then transfer to a capacious bottle, add the ether, and stop the bottle with a cork which enters the neck only about $\frac{1}{4}$th of an inch, and secure the same by means of strong twine. After the ether has acted sufficiently upon the tincture, I remove the stopper

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* Read at the Seventh Session.

and insert a tube of ⅛th to ¼th inch diameter on inside, extending very nearly to the bottom of the bottle, and reaching to within ½ inch of the outside of the neck, the neck of the bottle being about 1½ inches long.

In the neck of the bottle, outside of the tube, I stuff shoddy* (the material used in packing Ayer's sarsaparilla, etc.), and pack sufficiently firm to hold both tube and plug when the bottle is inverted, and the weight of the liquid bears upon the plug after the removal of the cork. I again insert the cork, tie securely with twine and invert the bottle, resting it on the ring of a filter or retort-stand, and leave it until the ether and tincture are separated. When the separation has taken place, I then remove the cork, and the tincture begins to drop slowly into a receiver, and continues until the whole of it has passed. I then turn the bottle to its usual position, insert the cork, and keep the ether for the next operation. The work of finishing is continued now as directed in the Pharmacopœia.

The advantages of this arrangement can readily be seen. The major part of the ether is saved, no waste occurring. The atmosphere is not impregnated with the noisome odor of ether. There is no possible danger of ignition of the ether as when a stoppered funnel is used, and less time is required to evaporate the tincture and rid it of the ethereal odor.

WASHINGTON, D. C., September 12th, 1876.

ON WINE OF TAR.†

BY CHARLES A. HEINITSH, LANCASTER, PA.

QUERY 34.—A convenient working formula for Wine of Tar, with samples of product.

To produce a wine of tar equally medicinal, and more easily made than by the formula published in the United States Dispensatory, suggested by the late Prof. Procter, viz., by the fermentation of malt, honey, and yeast, and adding the tar; five experiments were made.

1st. 8 ounces of tar were infused in 3 pints of beer, in a sufficiently warm temperature to keep the tar liquefied, with frequent stirring for twenty-four hours, left to subside, and poured off clear.

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* Raw cotton or sponge answers in the absence of shoddy.

† Read at the Seventh Session.

2d. 2 troy ounces were triturated with ℥ss. carb. magnesium, and 1 pint of beer, and filtered.

3d. 2 troy ounces of tar were triturated with ℥iv washed pine sawdust and 1 pint of beer, and filtered.

4th. One f℥ tincture of tar (made with ℥ij troy tar to ℥iv stronger alcohol), triturated with ℥ss. carb. magnesium, and afterwards with one pint of beer, and filtered.

5th. ℥iss. tar triturated with ℥ss. carbonate of magnesium, and 1 pint of sherry wine, and filtered.

The first formula by infusion is the most convenient, and makes as an efficient wine of tar as by the published process. The last is more eligible when intended to be prescribed in mixtures.

PAULLINIA SORBILIS.*

BY G. W. KENNEDY.

Query No. 9.—*Paullinia Sorbilis*—A treatise on this article, furnishing a formula for a liquid preparation of the drug.

In reply to the above query, accepted by the writer at our last meeting, held in Boston, I would submit for your consideration what I regard as a good working formula for a liquid preparation of the drug, the fluid extract. Having had some experience in the manufacture of the more common liquid preparations of Paullinia Sorbilis prior to my acceptance of the above query, and with a little experimenting since, has made the labor of investigating the above subject comparatively easy. The formula herewith presented will be found to give perfect satisfaction to the physician and pharmacist, and to fully represent the active constituents of the drug in solution:

Paullinia Sorbilis,	℥xvi (troy).
Strong alcohol,	f℥viij.
Glycerin (Bower's),	f℥iv.
Water (distilled),	f℥iv.
Dil. alcohol,	sufficient quantity.

Reduce the drug to a moderately fine powder. Mix the stronger alcohol, glycerin, and water together, and moisten the powder with the above menstruum, and transfer to a suitable apparatus for displacement, either a glass funnel or percolator. In packing the

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* Read at the Fourth Session.

powdered drug great care is absolutely necessary to see that it is compressed evenly and firmly, as the success of the preparation depends largely on the amount of care and attention given in this respect. After packing close the neck of the percolator with a cork, and slowly pour on the balance of the glycerin mixture, after which cover the percolator, and allow it to macerate twenty-four hours; remove the cork, and proceed with the percolation until twelve fluid ounces are obtained, which portion is to be reserved after the glycerin menstruum has all passed through. Continue the percolation with dil. alcohol until completely exhausted; evaporate at a temperature not exceeding 140° Fahrenheit to four fluid ounces, and mix with the reserved portion.

This formula will produce a deep reddish-brown preparation, of a bitter and astringent taste, reminding you of the taste of the drug.

SYRUP OF FERROUS IODIDE.*

BY W. H. PILE.

QUERY No. 8.—Whether the addition of five grains citric acid to the finished product of the formula of the U. S. Pharmacopœia for syrup of ferrous iodide, said to preserve it unchanged, was admissible?

As it appeared essentially necessary first to be assured of the fact of the protecting power of citric acid, previous to going into that of its admissibility, I have made comparative trials with and without the addition of citric acid several times during the year, but from some unknown cause, or want of skill on my part, I have not yet succeeded in making a syrup unchangeable in appearance (that is, not losing its original pale green color, but becoming yellowish-brown), by the addition of citric acid, as recommended, unless the syrup thus prepared was kept in full vials and sealed; but in this way no addition appears to be necessary. According to my present experience, preserving the syrup from contact with the air is the only sure way of keeping it unchanged, the syrup in the shop bottle when opened, always changing in appearance after longer or shorter time, and that either when exposed to the light or when secluded from it.

From this failure of mine, as here stated, I have not thought it necessary to say anything as regards the admissibility of citric acid in the preparation of syr. iod. iron.

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* Read at the Fourth Session.

ON COLOGNES FOR THE SICK-ROOM.*

BY GEORGE LEIS, LAWRENCE, KAN.

QUERY 29.—Is it advisable to have an officinal aromatic spirit that will represent a fine, refreshing cologne, to be used in lotions and for the sick-room? If so, give a formula and name for the preparation.

THERE is, undoubtedly, a want felt, if not expressed, among the people as well as our practitioners, for a preparation that shall at once serve as a pleasing perfume, an antiseptic deodorizer, and a medicated cosmetic lotion.

Such a lotion the writer has endeavored to place before this Association, after having made numerous experiments, results of which I give below in as brief a form as possible.

Our pharmacists are well aware of the fact that during the past years we have had innumerable compounds and chemicals offered as antiseptics, the merits of each being vaunted and extolled in its turn. After repeated trials of these new remedies, there is still a feeling predominant among those interested in the subject, that the desideratum has not yet been acquired. Some of the best disinfectants are in themselves objectionable; they either possess a disagreeable odor, or will stain and corrode. Ferrous sulphate (copperas) and manganous sulphate, though not really offensive, are comparatively inert. Iodate of calcium prevents decomposition, but if used as a local application causes too much pain. Acetic acid vinegar is at first grateful and refreshing, but becomes sickening. Chloride of lime (erroneously so-called), as the formula shows, $Ca(OCl)Cl$, is an uncertain compound, whose virtue depends wholly upon the amount of free chlorine it liberates; chlorine being an irritant, corroding gas, no one would desire to have it in a room containing articles of vertu or delicate metallic ornaments. Potassæ permanganas (permanganate of potassa) is also a very good disinfectant, but unless sprinkled and brought into contact with the air, is not so effective as thought, and in sprinkling the solution, it will necessarily produce stains upon everything it may come in contact with. Hence this is not at all desirable. Hydrate chloral is quite offensive, and the vapor stupefying. Acid carbolic or phenol, to which so much has been ascribed, is perhaps the best antiseptic we have in use at the present day, but its odor is certainly intolerable to an invalid. Its preparations are the less useful as they are less offensive.

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* Read at the Seventh Session.

I have now fully delineated the objections to the various disinfectants for the use of the sick-room, as per my investigations and experience. What we need, in my opinion, is a preparation that shall possess equal, if not greater, efficacy than any now in use, without irritant properties and unpleasant odor. Such a body, we hope, is to be found in salicylic acid.

While I am endeavoring to condense my answer to this query as much as possible, I will not attempt to give a chemical exposition of the nature of salicylic acid. Such an attempt would not only require a lengthy article of itself, but demand labored research, and had better be left for a query, which, no doubt, some member of this Association will cheerfully accept. Taking a passing glance, however, salicylic acid seems to be related, to a certain extent, with many organic disinfectants now in use, and we may, perhaps, consider the efficacy of such disinfectants to depend on their near relationship to salicylic acid.

For instance, Oleum gaultheriæ procumbens (oil of wintergreen), said by some chemists to possess remarkable absorbent and deodorizing powers, consists almost entirely of methyl salicylate. Oleum spirææ ulmariæ (oil of meadow sweet), also considered of value, is generally regarded as the aldehyd of salicylic acid. Oxybenzoic acid is isomeric with salicylic acid $C_7H_6O_3$.* Salicylic acid is intimately related to the aromatic series of acids, most of which possess antiseptic properties in a greater or less degree. Carbolic acid itself may be obtained from salicylic acid by dry distillation.

Numerous experiments, made recently by the writer, have fully corroborated those made by others. Salicylic acid has proved itself to have undoubted properties to prevent putrefaction and check the development of organic growths and parasites. Meat, lightly covered with salicylic acid in substance, remained sweet, while similar portions, in the same atmosphere, became offensive. Meat dipped in an aqueous solution of the acid, made the strength of 5 gr. each of salicylic acid and borax, to 1℥ of water, also

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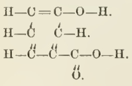
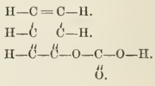
* The arrangement of the atoms in the molecule of salicylic acid and oxybenzoic acid is as follows:



$$\begin{array}{l} \text{H—C}=\text{C—O—H.} \\ \text{H—}\overset{|}{\text{C}}\quad\overset{|}{\text{C}}\text{—H.} \\ \text{H—}\overset{\|}{\text{C}}\text{—}\overset{\|}{\text{C}}\text{—C—O—H.} \\ \qquad\qquad\quad\overset{\|}{\text{O}}. \end{array}$$

Acid Salicylic.



$$\begin{array}{l} \text{H—C}=\text{C—H.} \\ \text{H—}\overset{|}{\text{C}}\quad\overset{|}{\text{C}}\text{—H.} \\ \text{H—}\overset{\|}{\text{C}}\text{—}\overset{\|}{\text{C}}\text{—O—C—O—H.} \\ \qquad\qquad\qquad\quad\overset{\|}{\text{O}}. \end{array}$$

Oxybenzoic Acid.

remained wholesome. The putrefying process was easily arrested in several compounds made for the experiment, by a free use of the salicylic acid.

No theory as to the manner in which salicylic acid exerts its influence has been advanced, but it probably acts as an anti-ferment, and in this manner annihilates the organic bodies produced by fermentation.

The following formulas are such as I have experimented with to my own satisfaction, and only hope they may prove as effectual and as satisfactory in the hands of others:

No. 1. ℞.—	Acidi Salicylici,	ʒss.
	Spiritus Vini Rectificati,	f℥iv.
	Olei Cinnamomi,	gtt. j.
	" Bergamii,	gtt. xv.
	Balsami Peruani,	fʒss.
	Make a solution.	

In order to make a clear solution of the above formula, dissolve the balsam of Peru in the spirits, and filter, then adding balance of ingredients. The aromatics used in perfuming the above solution are as nearly chemically compatible to salicylic acid as practicable.

No. 2. ℞.—	Acidi Salicylici,	gr. xx.
	Olei Gaultheriæ,	gtt. v.
	Spiritus Vini Rectificati Diluti,	f℥ij.
	Mix.	

In the above recipe, in the place of olei gaultheriæ you may add same amount of olei anisi, which is also of itself a powerful deodorizer, and may be preferred by many.

The basis of these solutions are salicylic acid, and any other combinations of odors can be added if desired which would harmonize with the salicylic acid. I give one for an example:

Salicylic Acid,	gr. xx.
Farina Cologne,	f℥ij.
Mix.	

You will find any one of the above recipes adapted for the use in sick-chambers, to neutralize the infected atmosphere attending fevers. In typhoid fever it will neutralize the fecal evacuations, which are pre-eminently contagious. In rooms that have been closed for months, without necessary ventilation, it would destroy the microscopic fungous growths inevitably present. The lotion should be diffused in the room with the aid of a spray tube or atomizer. Its presumptive analogy to benzoic acid would suggest its application as a cosmetic, the lotion to be added to the water used for ablution. A dilution applied to erysipelas is productive of ease to patients. Its balsamic properties promote the healing of cuts and sores, besides freeing them from morbid atmospheric influences.

I hope I have shown the many advantages and powers of salicylic acid over other disinfectants to the entire satisfaction of the readers.

Although owing to the comparatively high cost of salicylic acid it would possibly not be brought into general use, yet for minor purposes of disinfection its introduction in such a form will doubtless be met with a fair demand.

The name of such a preparation might be appropriately called *Lotio Antiseptica Fragrans* (Fragrant Antiseptic Lotion), which, in my opinion, gives the properties of the lotion in its name.

NOTES ON PERFUMERY.*

BY W. SAUNDERS, LONDON, ONTARIO.

THE art of compounding perfumes is an ancient one. It was practiced by the early Egyptians and other Oriental nations, and with them perfumes were in frequent use. In Holy Writ, Moses speaks of being directed to take sweet spices, stacte, onycha, galbanum, and frankincense, and confection them into a pure and holy perfume after the manner of the apothecary, to be offered up to the Lord; and in Proverbs we read of epicures indulging in the luxurious use of costly perfumes. The Grecians and Romans used perfumes freely, as well on their persons as at their feasts; they were also used with flowers at sacrifices to regale the gods. These fragrant compounds were in demand for theatres and other places where crowded audiences assembled, when their use subdued the offensiveness of a vitiated atmosphere. Different nations preferred different odors; with one the violet was most popular, while others gave the preference to the rose.

From the frequent mention of perfumes in the form of ointment,

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* Read at the Seventh Session.

it would appear that the solvent powers of fatty matters over the odorous principles of flowers, was among the earlier discoveries in this department. Subsequently fragrant waters were in great demand, and costly as these articles of luxury then were, they were nevertheless largely consumed. Grave men at times protested against the prevailing extravagance, and philosophers declared their aversion to perfumes. "There is the same smell," said Socrates, "in a gentleman and a slave, when both are perfumed;" hence in his opinion, the only odors desirable were those arising from honorable toils, and "the smell of gentility;" but in spite of protests the wealthy perversely and persistently followed their own tastes, anointed their bodies, pomaded their hair, and bathed their limbs in fragrant waters, as though the thoughtful ones had never spoken.

In later times, with the advance of civilization, the use of perfumes gradually extended to other nations, culminating in their general use throughout the civilized world. In some countries there was for a time stout opposition to the introduction of all such preparations. In England it was seriously thought to be a fit subject for legislative control. In 1770 an act was introduced into the English Parliament as follows: "That all women, of whatever age, rank, profession, or degree, whether virgins, maids, or widows, that shall from and after such act, impose upon, seduce and betray into matrimony any of his majesty's subjects by the scents, paints, cosmetic washes, artificial teeth, false hair, iron stays, hoops, high-heeled shoes, bolstered hips, shall incur the penalty of the law now in force against witchcraft and like misdemeanors, and that the marriage, upon conviction, shall stand null and void."

In large cities the manufacture and sale of perfumery is sometimes carried on as a separate occupation, yet as a rule this department of business as in ancient days is still associated with the trade and mysteries of the apothecary. Some may perhaps have but little sympathy with the manufacturer of perfumery, and may think that it were better handed over to the hairdresser or dealer in notions, and that the apothecary should devote his time exclusively to the more important duties of dealing out medicines, pure and simple, to meet the requirements of physicians and the wants of suffering humanity. This latter is doubtless the most legitimate and beneficent exercise of the apothecaries' skill, and ought always to be regarded as of primary importance, yet he will often have spare hours when he can enjoy the pleasures connected with the compounding and blending of odors, and at the same time develop a profitable and time-honored branch of his business.

The cultivation of the olfactories is an advantage to the pharmacist. The nose is an organ whose importance he cannot ignore in his business, and it is doubtful if better training can be found for it than in the compounding of perfumes. We all think it a gain to have a fine ear for music; why should we think less of an exquisite nose for odors? Surely this prominent member is as capable of cultivation as is the ear, not that an unusual development is desirable in either case, but rather the making the very best use of the organs with which we have been supplied. There are harmonies and discords in perfumes as in music; Piesse has reduced these to a scale which he calls the gamut of odors. "If," says he, "a perfumer desires to make a bouquet from primitive odors, he must take such odors as chord together; the perfume will then be harmonious."

For some time past the tendency has been to turn over the manufacture of perfumes too much to the specialist. This has probably resulted mainly from two causes,—first, the difficulty of procuring the materials used in the making of perfumes in a state of purity, and in the second place for want of plain and practical information on the subject. The first obstacle is less felt now than formerly, and to aid in the removal of the second is the main object of the present paper. My purpose is to place within the reach of every one of our members such information as will enable him with a little attention, to equal the finest productions of a Lubin, an Atkinson, or a Rimmell.

I have now before me samples of twenty different extracts, any of which will I think compare favorably with the best of those imported. I shall first briefly refer to the ingredients which enter into their composition, and afterwards give the formula for their production.

Alcohol.—One of the first requisites in the manufacture of good perfumes is pure alcohol, free from fusel oil or other foreign flavor. This purer grade of spirit is known in commerce as pure spirits, silent spirits, or deodorized alcohol, and may readily be distinguished from ordinary alcohol by the absence of that peculiar pungency of odor which is present to a greater or less extent in most commercial samples.

Ottos or Essential Oils.—It is of the greatest importance that these should be strictly pure and of the finest quality.

Pomades.—From these are prepared some of the simple extracts in the appended formulas, such as jasmine, tuberose, and cassia. The quality must be that known as triple pomade. The simple extracts are prepared as follows: one pound of the pomade is cut in small pieces and placed in a bottle of sufficient capacity, in which is put a pint of pure spirit. Place the bottle suitably stoppered in a water-bath, and apply heat sufficient to barely melt the pomade, shake well together, and repeat the shaking frequently until the fatty matter solidifies. In this way the pomade will be reduced to a finely divided or granular state, permeated thoroughly by the spirit. Allow this to stand for several days, giving it an occasional shake, then drain off the liquid extract into another bottle; if this fall short of a pint repeat the operation with a sufficient quantity of alcohol to make up to this measure. By subsequent and similar treatment, a second and even a third quantity of extract may be made, which although much weaker, will be found useful in the preparation of cheaper perfumes.

Extract of Orris.—Seven pounds of finely ground orris root of good quality, is treated by percolation with pure alcohol until one gallon of extract is obtained.

Extract Vanilla.—Four ounces of vanilla beans of the finest quality, powdered finely in a mortar with a sufficient quantity of dry white sugar (from four to six ounces), pack in a percolator, and percolate with proof spirit until one gallon is obtained.

Extract Tonka.—Take one pound of tonka beans, reduce to a coarse powder, and percolate with alcohol, to make one gallon.

Extract Musk.—Take of pure grain musk of the first quality two drachms. Mix half an ounce of liquor potassæ with four ounces of proof spirit, and triturate the musk with this mixture until it is thoroughly softened, and reduced to a creamy state; add enough proof spirit to make up about one pint; stir well, then allow the coarser particles to subside, and pour off the supernatant fluid. Rub the coarser portions again with a fresh portion of spirit, proceeding as before, and repeat the process until the musk is entirely reduced, and the quantity of extract measures three pints. Allow this to stand for a fortnight with occasional shaking, when it will be ready for use.

Extract Styrax.—Eight drachms of styrax balsam dissolved in one pint of alcohol.

Benzoic Acid.—Only that prepared from gum benzoin should be used.

FORMULAS.

Jockey Club.

Ext. Jasmin,	5 ounces.
“ Orris,	20 “
“ Musk,	7 “
“ Vanilla,	1½ “
Otto Rose, Virgin,	1½ drachms.
“ Santal Flav.,	1½ “
“ Bergamot,	2½ “
“ Neroli Super,	40 minims.
Benzoic Acid,	2 drachms.

Pure Spirit, sufficient to make four pints.

In this, as well as in all the following extracts, before adding the last portion of the spirit, replace as much of it with water as the perfume will bear without becoming milky, which will vary from two to eight ounces or more. This addition will make the perfume softer.

Moss Rose.

Otto Rose, Virgin,	2 drachms.
“ Santal Flav.,	2 “
Ext. Musk,	12 ounces.
“ Vanilla,	4 “
“ Orris,	2 “
“ Jasmin,	4 “
Benzoic Acid,	1 drachm.

Pure Spirit, sufficient to make four pints.

White Rose.

Otto Rose, Virgin,	2 drachms.
“ Red Cedar Wood, *true*,	6 minims.
“ Patchouly,	4 “
“ Orange, *fresh*,	½ drachm.
Ext. Tuberose,	2 ounces.
“ Orris,	2 “
“ Jasmin,	2 “
“ Musk,	2 “
Benzoic Acid,	1 drachm.

Pure Spirit (to which four ounces of rose-water has been added), sufficient to make four pints.

Victoria.

Otto Rose, Virgin,	2 drachms.
" Neroli, Super,	2 "
" Bergamot,	4 "
" Coriander,	16 minims.
" Pimento,	24 "
" Lavender (English),	16 "
Ext. Jasmin,	2 ounces.
" Orris,	16 "
" Musk,	2 "
Benzoic Acid,	2 drachms.

Pure Spirit, sufficient to make four pints.

Ess. Bouquet.

Ext. Musk,	4 ounces.
" Tuberose,	2 "
Otto Rose, Virgin,	1 drachm.
" Bergamot,	1½ "
" Neroli Super,	½ "
" Verbena, *true*,	8 minims.
" Pimento,	10 "
" Patchouly,	3 "
" Red Cedar Wood, *true*,	½ drachm.
" Lavender, English,	12 minims.

Pure Spirit, sufficient to make four pints.

Musk.

Ext. Musk,	1 pint.
" Orris,	6 ounces.
" Vanilla,	2 "
" Styrax,	2 drachms.
Otto Santal Flav.,	1 drachm.
" Bergamot,	2 drachms.
" Neroli Super,	10 minims.
" Patchouly,	12 "
" Lavender, English,	15 "
" Cinnamon, *true*,	6 "

Pure Spirit, sufficient to make four pints.

Patchouly.

Otto Patchouly,	2 drachms.
" Santal Flav.,	40 minims.
" Rose, Virgin,	40 "
Ext. Musk,	8 ounces.
" Orris,	8 "
" Vanilla,	4 "
" Styrax,	2 drachms.

Pure Spirit, sufficient to make four pints.

Millefleur.

Otto Rose, Virgin,	1 drachm.
" Red Cedar Wood, *true*,	1 "
" Orange, *new*,	1 "
" Pimento,	20 minims.
Ext. Orris,	6 ounces.
" Jasmin,	2 "
" Styrax,	1 ounce.
" Tonka,	4 ounces.

Pure Spirit, sufficient to make four pints.

Ylang Ylang.

Ext. Tonka,	3 ounces.
" Musk,	4 "
" Tuberose,	4 "
" Cassia,	4 "
" Orris,	8 "
Otto Orange, *new*,	2 drachms.
" Neroli Super,	½ drachm.

Pure Spirit, sufficient to make four pints.

Tuberose.

Ext. Tuberose,	24 ounces.
" Musk,	4 "
" Jasmin,	1 "
Otto Rose, Virgin,	1 drachm.
" Neroli Super,	10 minims.
Benzoic Acid,	2 drachms.

Pure Spirit, sufficient to make four pints.

Spring Flowers.

Ext. Orris,	4 ounces.
" Jasmin,	4 "
" Musk,	4 "
Otto Bergamot,	2 drachms.
" Neroli Super,	½ drachm.
" Verbena, *true*,	10 minims.
" Red Cedar Wood, *true*,	1 drachm.
Benzoic Acid,	1 "

Pure Spirit, sufficient to make four pints.

Wood Violet.

Ext. Orris,	12 ounces.
" Tuberose,	2 "
" Jasmin,	1 "
" Musk,	4 "

Otto Bergamot,	2 drachms.
" Lavender, English,	1 drachm.
" Verbena, *true*,	10 minims.
" Amygd. Amar.,	12 "
" Coriander,	6 "
" Sweet Flag,	4 "
" Bay Leaves,	4 "
Benzoic Acid,	1½ drachm.

Pure Spirit, sufficient to make four pints.

West End.

Ext. Orris,	12 ounces.
" Jasmin,	4 "
" Musk,	8 "
" Cassia,	4 "
" Styrax,	1 "
Otto Bergamot,	3 drachms.
" Verbena, *true*,	15 minims.
" Neroli Super,	½ drachm.
" Rose, Virgin,	1 "
" Red Cedar Wood, *true*,	1 "
Benzoic Acid,	1 "

Pure Spirit, sufficient to make four pints.

Stephanotis.

Ext. Cassia,	4 ounces.
" Tuberose,	4 "
" Jasmin,	2 "
" Musk,	8 "
" Orris,	8 "
" Tonka,	3 "
Otto Rose, Virgin,	1 drachm.
" Neroli Super,	½ "
Benzoic Acid,	1 "

Pure Spirit, sufficient to make four pints.

Rondeletia.

Otto Lavender, English,	1 ounce.
" Cloves,	½ "
" Bergamot,	½ "
" Rose Geranium, *Turkey*,	2 drachms.
" Cinnamon, *true*,	20 minims.
" Rose, Virgin,	10 "
" Santal Flav.,	1 drachm.
Ext. Musk,	2 ounces.
" Orris,	4 "
" Vanilla,	2 "
Benzoic Acid,	1 drachm.

Pure Spirit, sufficient to make four pints.

New-Mown Hay.

Ext. Tonka,	25 ounces.
" Musk,	6 "
" Orris,	8 "
" Vanilla,	1 "
" Styrax,	1 "
Otto Bergamot,	1 drachm.
" Neroli Super,	15 minims.
" Rose, Virgin,	10 "
" Cloves,	6 "
" Lavender, English,	10 "
" Patchouly,	10 "
" Santal Flav.,	1 drachm.
Benzoic Acid,	1½ "

Pure Spirit, sufficient to make four pints.

Frangipanni.

Ext. Orris,	4 ounces.
" Tuberose,	2 "
" Musk,	4 "
" Vanilla,	2 "
" Jasmin,	1 "
" Styrax,	1 "
Otto Neroli Super,	1 drachm.
" Rose, Virgin,	½ "
" Santal Flav.,	1 "
" Red Cedar Wood, *true*,	1 "
" Pimento,	½ "
" Cassia,	20 minims.
" Bergamot,	½ drachm.
" Ginger,	4 drops.
" Lavender, English,	6 "
Benzoic Acid,	2 drachms.

Pure Spirit, sufficient to make four pints.

Clove Pink.

Ext. Jasmin,	12 ounces.
" Orris,	12 "
" Musk,	8 "
Otto Rose, Virgin,	1 drachm.
" Cloves,	2 drachms.
" Neroli Super,	1 drachm.
" Pimento,	10 minims.
" Patchouly,	20 "
" Santal Flav.,	2 drachms.
Benzoic Acid,	1 drachm.

Pure Spirit, sufficient to make four pints.

Violet.

Ext. Orris,	2 pints.
" Tuberose,	4 ounces.
" Vanilla,	3 "
" Musk,	3 "
" Tonka,	2 "
Otto Rose, Virgin,	1 drachm.
" Neroli Super,	40 minims.
" Pimento,	12 "
" Bergamot,	1 drachm.
Benzoic Acid,	1 "

Pure Spirit, sufficient to make four pints.

Mignonette.

Ext. Orris,	12 ounces.
" Tuberose,	4 "
" Vanilla,	4 "
" Musk,	2 "
Otto Rose, Virgin,	1 drachm.
" Neroli Super,	1¼ "
" Pimento,	12 minims.
Benzoic Acid,	1 drachm.

Pure Spirit, sufficient to make four pints.

II. MATERIA MEDICA.

NOTES ON CANTHARIDES.[*]

BY WILLIAM SAUNDERS, LONDON, ONTARIO, CANADA.

The fact that we have in America several species of cantharides, as well as some other closely allied vesicating insects which might at any time be used as a substitute for *Cantharis vesicatoria* (the Spanish beetle), has long been known. The species, however, to which attention has heretofore been chiefly drawn are some of the smaller ones found in the more northern parts of the country, especially *Epicauta* (*Cantharis*) *vittata* and *cinerea*, while the larger species south and west have been almost overlooked. The northern species referred to compare very unfavorably in size with the Euro-

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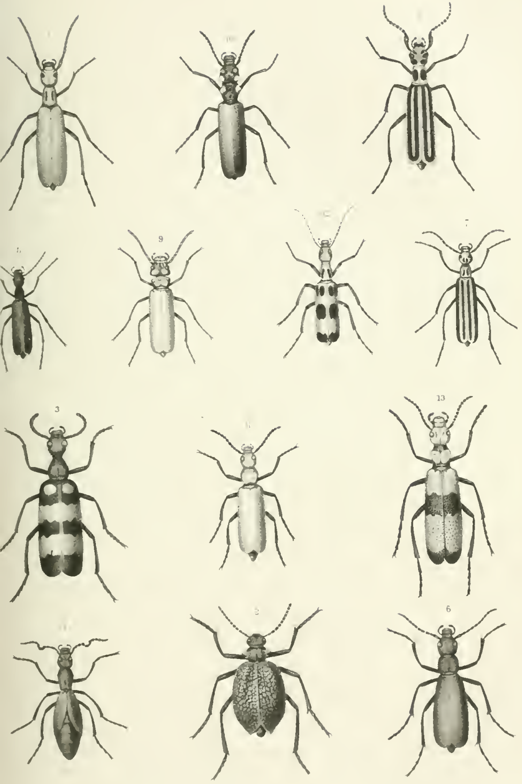
[*] Read at the Sixth Session.

pean *vesicatoria*, a feature which adds to the cost of collecting them; it would also appear that this difference of size has often carried with it the impression of a corresponding inferiority. Another bar to their successful introduction has been found in their color. By a strange misconception the presence of the brilliant green particles of the wing-cases in the powdered imported insect has been associated with their activity, and any sample of powdered cantharides or of prepared emplastrum, where these brilliant particles are wanting, would by many physicians be at once condemned. The recent introduction of the Chinese beetle *Mylabris cichorii* has done much to remove the latter objection, still notwithstanding that it has been shown by Prof. Maisch (see Proc. Am. Pharm. Assoc., 1872) that the *mylabris* is much stronger than vesicatoria, yielding, according to his analysis, fully double the quantity of cantharidin, the relative market price of the insects belonging to the two species indicates that popular prejudice still favors the use of vesicatoria. Our *vittata* and *cinerea*, when powdered, nearly resemble the *mylabris* in color.

In the western and southern portions of our continent we have species which are large and abundant, and which there is every reason to believe possess all the activity we need, and my chief object in this paper is to draw attention to this fact, and if possible to acquaint our members with the appearance of these species, and detail their life history and habits as far as they are known, so that those who reside in these more distant regions may be induced to collect them in sufficient quantities to admit of their being thoroughly tested. It is not probable that they would be found in any respect less valuable as a vesicating agent than the Spanish beetle.

Through the kindness of Dr. George H. Horn, of Philadelphia, whose extensive contributions to our knowledge of American coleoptera have made his name familiar both in Europe and America, I have been supplied with much information in reference to the species here treated of, and also with specimens of the insects themselves to submit for your inspection. I am also indebted to Prof. C. V. Riley, State Entomologist of Illinois, for some valuable notes on the habits of these insects. In addition I have had a lithographic plate prepared by Messrs. Sinclair & Sons, of Philadelphia, under the kind supervision of Dr. Horn, in which each of the species referred to is figured of the natural size, excepting 7 and 8, which are somewhat enlarged. This plate is remarkably well executed, and is probably one of the best ever published in



1. Meloe angusticollis Say.
2. Cysteodemus armatus Lec.
3. Mylabris cichorii Linn.
4. Macrobasis albida Say.
5. Macrobasis atrivittata Lec.
6. " " segmentata Say.
7. Epicauta vittata Fab.
8. " " cinerea Forst.
13. Tegrodera erosa Lec.
9. Cantharis vesicatoria Linn.
10. " " vulnerata Lec.
11. " " nuttalli Say.
12. Pyrota mylabrina Chev.

this department; besides the American species it contains figures of *M. cichorii* and *C. vesicatoria.*

I shall first enumerate the species, giving brief descriptions, as plain and void of technicalities as possible.

1. *Meloe angusticollis*, Say.—This insect (see Fig. 1) is of a dark bluish-violaceous color, with the head, thorax, and wing-cases thickly punctured with minute dots or impressions. The thorax is slender, narrower than the head; feet slightly hairy, with the spines of the legs reddish. Found in the Eastern States and in many parts of Canada; occasionally abundant under stones.

2. *Cysteodemus armatus*, Lec.—Entire body bluish-black; thorax with a strong lateral spine on each side; wing-cases very convex, and much larger than the abdomen which they cover, and with very coarse elevated reticulations on their surface. This insect varies greatly in size; the figure represents a medium-sized specimen.

Extremely abundant in Arizona and the desert regions of California wherever the greasewood, *Larrea Mexicana*, grows. This insect is not as good a vesicant as some others; the proportion of hard tissue in its structure is large as compared with the softer and more active portion, too large, perhaps, to admit of its being of much value.

3. *Mylabris Cichorii*, Linn.—All parts of this insect are black excepting the wing-covers, which are of an obscure yellow, with three transverse, black, irregular, undulating bands, the one at the apex broadest. The first band is sometimes interrupted, and occasionally reduced to three or four spots.

Found in abundance in the southern portions of China, and also throughout India on the flowers of the wild chiccory and other composite plants. It is also said to occur in Southern Europe, extending from Italy through Greece and Egypt to China. For further details in reference to this insect the reader is referred to an interesting and valuable paper by Prof. Maisch, in the volume of Proceedings for 1872, p. 246.

4. *Macrobasis albida*, Say.—All parts of body black, densely covered with minute greenish or yellowish-white hairs. The thorax is slightly longer than wide, the wing-covers broader than the thorax, becoming wider behind, and are densely punctured.

Abundant in Texas, New Mexico, and on the plains.

5. *Macrobasis atrivittata*, Lec.—Also black; form more elongated than *albida;* head thickly clothed with fine black hairs, with a small white space in front of the eyes; thorax with grayish hairs,

with a large black space in the middle; the wing-covers have black hairs, and their apex and sides are margined with gray; there is also a moderately broad grayish stripe extending from the humerus to near the apex.

Found in Texas, and is probably quite abundant, but I have not been able to obtain definite information on this point.

6. *Macrobasis segmentata*, Say.—This insect is black also, with the segments of the body beneath margined whitish. The thorax is nearly as broad as long, and its posterior edges are grayish. Wing-covers finely punctured and sparsely covered with short black hairs.

Occurs with *M. albida*, and is also abundant.

7. *Epicauta vittata*, Fab.—The head of this species is of a light reddish color, with darker spots; antennæ black; thorax black, with three yellow lines; wing-covers black margined with yellow, and with a yellow stripe down the middle. Abdomen and legs black, covered with grayish hairs.

Is found throughout the United States and Canada, but more abundant northward and westward of the Carolinas, extending to near the base of the Rocky Mountains. In the south it is replaced by *lemniscata*, a species closely resembling *vittata*, but differs in having another white stripe. This species has been tested, and has been found fully equal to *vesicatoria* as a vesicant.

8. *Epicauta cinerea*, Forster.—Black, closely punctured, and clothed with grayish hairs; beneath, clothing dense, upper surface variable. Head sparingly hairy. Thorax densely punctured, sometimes entirely covered with gray hairs, often with a large triangular central space black, divided by a grayish line along the middle. Wing-cases finely punctured, and either entirely grayish or margined with grayish all around.

Occurs all over the United States east of the Rocky Mountains, and in many parts of Canada. In the Southern States it becomes larger, with the wing-cases entirely gray, fully equal in strength to *vesicatoria*.

9. *Cantharis vesicatoria*, Linn.—Color, above and below, a beautiful shining golden green; head, thorax, and wing-covers closely punctured; antennæ black.

Found most abundant in Spain, Italy, and the south of France; also found in all the temperate parts of Europe, and in the west of Asia.

10. *Cantharis vulnerata*, Lec.—Body black; head orange-yellow,

sometimes with a broad black stripe down the middle; wing-cases black.

Extremely abundant throughout the entire Pacific region west of the Sierra Nevadas. Dr. Horn has seen bushels of this insect in some localities literally strewing the ground, also very common on a species of Baccharis; he has also experimented with them, and found them powerfully vesicant, and producing strangury very readily when taken internally in the form of tincture.

11. *Cantharis Nuttalli*, Say.—Head deep greenish or golden green, antennæ black; thorax golden green with a polished surface, and a few small scattered punctures. Wing-cases golden purple striped with green. Body beneath green, polished; thighs purplish, feet black. This large and beautiful insect is extremely abundant in Kansas and Colorado.

12. *Pyrota mylabrina*, Chev.—Entire body and legs dull ochre yellow. Thorax with two, sometimes four black spots; wing-covers with three transverse black bands, divided in the middle by the suture, the anterior one being sometimes further divided into four spots; knees and feet black. Found from Kansas to Mexico, and is abundant throughout the whole region.

13. *Tergrodera erosa*, Lec.—Body and legs black; head and thorax reddish, the former with a deep groove; wing-covers bright yellow, their surface roughened with coarse reticulations, with a median and apical black band, which in some specimens are wanting. Abundant in Southern California and peninsula of Lower California, on a low herbaceous plant with a blue flower.

In all these species the female is more valuable than the male, especially when well distended with eggs, owing to the relatively larger proportion of the soft parts. Eggs have the same power as the other soft parts; the blood Dr. Horn believes to be more active than any other portion.

Having referred in detail to the perfect insects, it is now proposed to sketch their history as far as known through the earlier stages of their existence.

The life history of Meloe, which has been well worked up in Europe, may be taken as a type of all the species mentioned, since all the facts accumulated on this subject point to a similarity in the character of the transformations and habits, which in the vesicating insects are very remarkable.

In the 20th volume of the "Linnean Transactions" there is a memoir on the natural history of Meloe, from which many of the following facts are derived.

The Meloe beetles when fresh from their pupa cases in spring are feeble, move slowly, and have their bodies small and contracted, but after feeding a few days these enlarge greatly; the abdomen of the female expanding to twice its original size owing to the enormous quantity of ova within its body in process of development. The abdomen will then measure an inch or more in length, and appears to be dragged along with difficulty. They are fond of basking in the hot sunshine, and are said to be most active during the early and middle parts of the day. When confined in boxes for the purpose of observing their habits, it is necessary to expose them much to the sun and supply them with an abundance of food, they are then quite at home and their proceedings may be easily watched. They drink freely of water and require their food to be well wetted. In a few days after leaving their winter quarters they pair.

The eggs are deposited in the earth. A small excavation is made by the female, sometimes as much as two inches in depth, into which when finished she projects her body with the head just perceptible at the entrance. After remaining in this position ovipositing for about two hours, the body is withdrawn and the earth raked with her feet into the hole until it is entirely closed. These burrows are commonly made among the roots of grass in a dry soil and a sunny spot, often on the margins of a dry footpath. The female always deposits two and sometimes three or four separate layings of eggs, at intervals of from two to three weeks. The first is always the most abundant, amounting usually to three or four thousand. After each deposit the abdomen seems to be almost entirely emptied; the insect then feeds voraciously, and fresh ova are soon developed.

The eggs when first deposited are about one-twentieth of an inch in length, slightly conical, obtuse at both ends, and of a bright orange color. They are placed in such a way that they may be parallel to each other, and adhere together at their sides, with one end directed to the entrance of the burrow. The duration of the egg stage is greatly influenced by temperature, averaging from four to five weeks.

From the egg there escapes a little active agile creature, somewhat resembling a *pediculus* in habits; in fact the larva of one of the European species was described by so eminent an entomologist as Kirby, in 1802, as *Pediculus melittæ*. This young larva, a magnified illustration of which is given in Fig. 49, is of a bright yellow color, and of an elongated form, with fourteen segments. The three segments which constitute the trunk are strong and powerful, for the attachment of the legs, which are furnished with sharp pointed claws, especially adapted for clinging securely to any object. The anal segment on its under surface is developed into a pair of short prolegs. It moves with great celerity with its six true legs; it can also make use of its anal prolegs, and thus climb a nearly smooth and vertical surface.

FIG. 49.

The young larvæ of most insects, if food is not supplied to them within a day or so of the time of their escaping from the egg, will die of starvation, but these young creatures will live from two to three weeks without food and maintain their activity, a wonderful adaptation to the circumstances in which they are placed. When hatched they crawl to the surface and run up the stems of various plants, and often lodge themselves in the flowers and there await the visits of bees and other insects who alight to collect pollen or honey. They watch their opportunity, and attach themselves with great readiness to any of these insects who may come within their reach. It is astonishing with what celerity they fasten themselves to their victims the instant any part of its body is accessible, and with what tenacity they adhere to it, seizing it by the leg, wing, or hairs of the body, and crawling up and adhering around the insertion of its legs between the head and thorax or the thorax and abdomen, exciting the greatest possible uneasiness in the winged insect, who vainly endeavors to detach them from its body.

Some observers are of opinion that the parasite draws nourishment from the bee on which it fastens, but the main object of this instinctive attachment seems to be to get access to the cells in which the young and food are stored. Once here the young larva of Meloe is said to attack the larva of the bee or other hymenopterous insect whose nest is thus invaded, and being furnished with strong mandibles they thrust them into the soft parts of their victims, and prey on their substance through the wounded integuments, while the young bee is nourished with the stored pollen and honey. In this state having no longer any use for their active limbs they are gradually reduced to mere tubercles, and after a change of skin, the once active and sprightly creature assumes the form of a thick fleshy maggot. In this form it continues to feed on the young bees or the bee-bread and honey stored for their use, and after passing through some remarkable changes while in the larval condition, first changing to a semi-pupa, then to another form of larva, after which it assumes the true pupa state, in which condition it remains in its snug retreat until the following spring, when it bursts its bonds and appears as a beetle.

The young Meloe larvæ often attach themselves to the hairs of insects which construct no cells and do not store up food for their young; and in such cases, which must be very numerous, they necessarily perish. In the light of this fact we can appreciate the importance of the great fecundity of the females.

The larva of *Cantharis vesicatoria* is almost identical in form with that of *Meloe*, but soon after escaping from the egg it changes from a yellow to a darker hue, and finally to a deep black.

The history of our American species is as yet very fragmentary. Dr. Packard has observed the larva of *Meloe angusticollis*, and found it to differ but little from its European congeners. Prof. Riley has made some observations on *Epicauta vittata*. He describes the eggs of *vittata* as follows: Length 0.08 inch, five times as long as wide, elliptical and so uniform in diameter that it is difficult to say which is the anterior end, though there is a slight difference. Egg sometimes very slightly curved. Color very pale whitish-yellow, smooth and shining.

The young larva is yellowish-brown, borders of head and thorax and of joints somewhat more dusky than general surface; tip of jaws and eyes dark-brown. Legs and venter paler; venter not corneous except at sides and across segments eleven and twelve. About ten stiff hairs visible superiorly on the posterior border on the middle segments, with a cone-like prominence at the base of each and six minor bristles in front of them. There are also rows of fainter ventral bristles.

The curious history of these insects throws some light on the fact that while in some localities they are enormously abundant one season, they will be very scarce another. It is to be expected that there would be an alternation between the abundance of certain species of hymenopterous insects and cantharides. When the insects they prey on are abundant the blistering beetles multiply amazingly, and during this immense multiplication exhaust the stock of material on which they feed to such an extent, that a year of great abundance in any given locality can scarcely fail to be followed by a season of corresponding scarcity. In other, and sometimes adjacent localities, where the same causes have not operated to a like extent, the insects may be common enough. The great abundance of the sociable and solitary bees in the great plains of the West, will probably always afford food sufficient to admit of the maturing of large broods of cantharides.

ON PYCNANTHEMUM LINIFOLIUM AND ITS CHEMICAL CONSTITUENTS.*

BY CHARLES MOHR, OF MOBILE, ALA.

I RECEIVED about two years ago specimens of this plant, of Dr. E. M. Vasser, of Cahaba, Ala., for botanical determination. He found it highly esteemed and extensively used as a remedy for all disorders arising from a debilitated and impaired state of the digestive organs, by the negroes on the plantations of the Alabama and Tombigbee Rivers, every family keeping carefully stowed away a sufficient supply to last from one season to the other, and where it is used in the form of an infusion in hot water or weak spirits. At the meeting of the State Medical Association of Alabama, in April, 1875, Dr. Vasser first directed the attention of the profession to the plant as a remedial agent, giving his observations made on a number of cases. Since that time further proof has accumulated, from practitioners in different parts of Alabama, confirming its value in the treatment of atonic dyspepsia.

The *Pycnanthemum linifolium* forms with the P. lanceolatum a small, well-defined group of a strictly North American genus, characterized by narrow, rigid, entire leaves, bearing the flowers, surrounded by small, closely-appressed, rigidly-pointed bracts, in small globular heads on the ends of the more or less densely crowded paniculate branches. The bitter, resinous, and astringent principles are in these narrow-leaved species more prevailing than in the more numerous broad-leaved species, where the volatile oil is predominating. Both have been described as one species by our earlier botanists as the Thymus virginicus, L., but closely allied as they are, the P. linifolium is readily distinguished by its narrow

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* Read at the Seventh Session.

linear leaves, mostly crowded in the axils; the round, smoothish stem and the smaller heads disposed in a closer inflorescence. As it has been already described by Prof. Maisch, in the American Journal of Pharmacy, and also in our botanical manuals, a more detailed description can here be omitted. By the request of the above-named physician I have attempted a chemical examination of the plant, which, however deficient, as it is, by want of facilities for analytical work of that nature, has brought to light facts which in some degree account for its therapeutical properties, and which are sufficiently interesting to invite nearer investigation.

The aqueous filtered solution of the hydroalcoholic extract of the plant gives at once reactions that show the presence of a peculiar acid of the tannic acid series, as by the addition of gelatin it is not affected, ferric chloride causing a deep green color and subsequently a grayish precipitate, and yielding with the solution of cinchonia or quinia a copious precipitate. Evaporated to dryness and heated with strong sulphuric acid, a deep blood-red color is produced.

To obtain this acid in a state sufficiently pure to allow, by a study of its chemical and physical properties, its identification, a quantity of the well-powdered, perfectly-dried plant was digested for some days with concentrated ether in a percolator, and the percolation continued to its complete exhaustion by that menstruum. The greatest part of the coloring matter was thus removed without any apparent loss of the substance looked for, as the attempted aqueous solution of the dried ethereal extract was not affected by ferric salts. Alcohol of 75 per cent. was then used for further extraction, until the resulting liquid was free of color and taste. The alcoholic tincture was freed from alcohol by evaporation over the water-bath, diluted with water, filtered, and neutral lead acetate added, as long as precipitation did take place. The well-washed precipitate was decomposed by sulphuretted hydrogen, and the resulting filtered clear liquid evaporated to the consistency of a thick syrup. By addition of water a solution of a deep yellow color was obtained containing yet gum, which was removed by treatment with alcohol of 80 per cent. It possessed a faint odor, a decided acidulous and astringent taste, reddening litmus-paper strongly. Evaporated to dryness, a brown amorphous mass was obtained, which, heated on platina foil, fused and emitted vapors reminding one of the odor of burnt coffee. It is scarcely soluble in ether, difficult in alcohol above 90 per cent., easily in weaker alcohol and water. It is *not* precipitated by *gelatin*, *albumen*, and *tartrate of antimony* and *potassa*, but completely by solution of quinia.

Caustic alkalies cause a deep-brown color in the yellow solution. Baryta water produces a yellow precipitate; ferric chloride, a fine emerald-green color, and after standing awhile a dirty, grayish, dark precipitate.

Basic lead acetate, a yellow precipitate soluble in potassic hydrate.

Nitrate of silver, by boiling heat, is reduced in the specular form.

Heated with strong sulphuric acid, the somewhat concentrated solution is changed to a deep blood-red liquid. All these reactions are identical with those obtained by the treatment of *caffeo-tannic acid* with the same agents. I convinced myself of this fact by the study of the reactions of caffeo-tannic acid prepared by myself, after the method of Hlasiwetz. But not having succeeded in the preparation of a pure metallic salt of the acid of the Pycnanthemum linifolium suitable for ultimate analysis, nor been enabled to study its products of decomposition, I am not prepared to declare it as identical with caffeo-tannic acid, however strongly its physical and chemical properties seem to speak for it. It would be interesting to find this acid in a labiate; so far it has been detected besides in the coffee bean, in the leaves of the Ilex Paraguayensis.

Besides these acids the following substances have been separated in the course of the analysis of the plant:

1. By distillation with water a volatile oil, limpid, colorless, of but a faint, but peculiar odor of the fresh or fresh-dried plant, and a bitterish, pungent taste.

2. By treatment with concentrated ether a caoutchouc-like resin, when as much as possible freed from the adhering coloring matter, of a dull, dark, and thin lamina, light-gray color, soft consistency, highly elastic. Insoluble in alcohol and water, soluble in ether, chloroform, and bisulphide of carbon. By the action of nitric acid, converted into a white friable substance.

3. Dark-green resinous substance (chlorophyll) of a faint hemp-like odor, almost without taste, soluble in alcohol of 90 per cent. and in aqueous alkalies, the latter changing its color to yellow, insoluble in water.

4. By maceration of the dry ethereal extract with alcohol of 65 per cent. a bitter resin of greenish-yellow color, possessing in a high degree the odor and taste of the plant. It is not a glucoside,

and mercurio-potassic iodide gives no indication of the presence of an organic base.

5. By maceration of the ethereal extract with water a peculiar reddish-brown coloring matter. As seen under the microscope, it is found to consist of fine sharp-defined globular granules. It is precipitated from the at first entirely colorless, aqueous, cold infusion of the ethereal extract. It redissolves with difficulty in water, and is precipitated without change of color by basic lead acetate and neutral sulphate of alumina. Destroyed by highly-diluted mineral acids.

6. Gum.

7. Small quantities of sugar found in the filtrate, from the lead precipitate. No organic base could be found; of inorganic bases lime was predominating.

SENEGA ROOT.*

BY JACOB D. WELLS, CINCINNATI.

QUERY 1.—An essay on Senega root, embracing the history of its introduction, its geographical range, and its present importance as an article of commerce.

THE Senega plant is a native of this country, and in points of importance it is one of our leading medicines. The plant received its name of Senega in consequence of being named by our early settlers after a tribe of Indians, located at one time in Virginia, called the Senegaroos, who secretly held the root as an antidote against the bite of the rattlesnake, thereby it received the English name of rattlesnake root. In the year 1735 Dr. Tennant, of Virginia, secured the secret from the Indians by offering them alluring rewards for their discovery, which was, as an antidote, that the root was to be given internally, and applied externally in the form of a cataplasm. Dr. Tennant invited the attention of physicians to this medicine, and for bringing it into medical practice for the cure of one of the most dreaded attacks upon the human race, the bite of a venomous reptile; for this the Doctor was in return rewarded by the House of Representatives of the State of Pennsylvania. Suffice it to say that so far as the root's usefulness was for the cure

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* Read at the Fourth Session.

indicated, it only proved as one of the often-told "snake stories," but singularly not a stranger to the traditions of ancient pharmacy. The Senega was introduced into England in 1759 by Philip Miller as a garden plant; not having a handsome appearance, it was brought into disfavor and discarded.

As to the plant's geographical range, it grows sparingly in isolated places on sides of hills and woods through Canada, along the western slope of the Alleghany range of mountains to the Ohio River, embracing the Ohio Valley to the State of Indiana, in which latter State, in its southern portion, considerable Senega is found. The growth increases through the western parts of the Virginias, North Carolina, Kentucky, Tennessee, and the northern parts of Georgia, Alabama, and Texas. It is scarce in Missouri, but grows profusely in many parts of Iowa and Minnesota. There are conflicting reports as to whether the Senega plant does or does not grow in Montana.

In looking over the different explorations under the patronage of our government, from the Mississippi River to the Pacific Coast, no Polygala Senega was found from the 32d to the 45th parallel, and from 97 longitude to the Pacific Coast. In the explorations of Lieutenant Park, accompanied by the celebrated botanist, Dr. John Torrey, who in his collection of plants only found two Polygalas, the P. cuculata and the P. Leidenheimeri, he states that no other Polygalas could be found through California nor any part of the Pacific Coast.

Prof. Gray, in his collections of plants east of the Rocky Mountains, makes no mention of having found Senega. Dr. J. S. Cooper, in his explorations embracing the 47th and 49th parallel, also found no Senega. Dr. Bigelow's reports give the same account.

In my endeavors to ascertain the importance of Senega root as an article of commerce I have been unsuccessful; the Chief of the Bureau of Statistics, the Hon. E. Young, in Washington, replied to my inquiry that no separate account of the exports of Senega root was kept by our custom-houses.

In the reports of our exports of last year sent to me, I find very meagre accounts are kept of the exports of medicines in general from the United States, which defect certainly calls for an amendment to existing laws upon this subject by Congress, for if it is important to keep statistics of the exportation of articles of commerce as food that sustain human life, it is equally as important to have a complete record kept of medicines exported that relieve human suffering.

A leading wholesale drug house of New York estimates the annual exportation of Senega root at over two thousand pounds.

COTTON-ROOT BARK.*

BY J. U. LLOYD, CINCINNATI, OHIO.

QUERY 11.—The fluid extract of cotton-root bark occasionally gelatinizes on keeping; can a modification of the process for making this fluid extract be suggested which will prevent such a change?

To which principle and to what influence is it due, and has the bark of the green root any superiority over that of the drug in the preparation of the fluid extract?

WHEN fluid extract of gossypium is prepared from prime bark, like that described by Prof. J. M. Maisch, Am. Jour. Pharm., 1875, p. 11, it is liable to be either yellowish-brown or of a deep red color. When it is made from inferior or injured bark it is usually brownish-red. With prime bark, if the percolation is conducted rapidly, the menstruum passing through in a few hours, the percolate will be yellowish-brown and neutral; upon standing it changes in color, and soon assumes a rich deep red color, and acquires an acid reaction. If the percolation progresses slowly, so that the menstruum does not begin to drop until twenty-four or thirty-six hours have passed, the extract will be red to begin with and give an acid reaction. Thus it will be seen that the manner of conducting the percolation will influence the color of the recent extract, and account for the different appearances so frequently observed by manufacturers, and occasionally mentioned by writers. The above explanation is sufficient to make this point clear, and it is unnecessary I should consume more time here. My experience is that fluid extract of gossypium, when prepared from prime bark, will invariably change to deep red upon standing, if it is not so when recent, provided it contains 50 per cent. or more of alcohol.

Water will not bring about the above-named change; the chemical reaction which gives rise to the red coloring matter will not take place in infusions and decoctions, consequently they are of a

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* Read at the Fourth Session.

yellowish muddy color when prepared, and remain so until fermentation ensues.

Occasionally fluid extract of gossypium gelatinizes. I will say here that in my opinion this word does not convey the meaning intended, for it does not describe the appearance of the material produced by the disintegration of the extract, as it is quite different from a jelly. It is not a quivering homogeneous mass such as is produced by gelatin or pectin. but a substance resembling some tenacious, opaque, reddish-brown precipitate suspended in muddy water. Upon inclining a bottle containing this material the liquid will drain away from the semi-solid portion, which will continue to maintain its original bulk unless the vial is shaken, whereupon it will break into pieces, quite smooth and soft to the touch, although to the eye they appear to be thickly studded with grains of solid matter. When this change takes place the deep, rich, red color of the extract disappears; the solidified portion is reddish-brown and the liquid usually muddy. It reacts strongly acid.

The solid portion will not dissolve in alcohol, solution of alkalies, or in dilute acids. The application of heat will not make it dissolve again in the original menstruum, as is the case with precipitates which occur in certain other fluid extracts, especially those resulting from pectic fermentation.

The investigation of the disintegration or gelatinization of this extract is rather difficult. There is no certain time after the extract is made when we may expect it to occur. There is no condition I am acquainted with that will bring it about at option. I have made the extract in eighty pound batches, and only heard complaints from a few pounds out of each, sometimes from none. I have placed numerous specimens aside for long periods, but have never succeeded in inducing a single sample to decompose, and yet from time to time I would hear that with others the change had taken place in specimens taken from the same lots mine were out of. I have made many small lots of the extract, four or five pounds at once, by different processes as experiments, but have never been so lucky as to have any specimen solidify under my notice, consequently as I could not experiment individually upon the matter with any certainty or degree of satisfaction, my only course was to manufacture regular batches, keep careful notes, and change my processes when convinced by reports of their imperfection. Each experiment, from necessity, occupied from one to two years, consequently all the investigations embraced within my report upon this part of my query were made before I accepted the subject from the Association; they were instituted for the purpose of enabling me, as a manufacturer, to overcome imperfections in formulas I had used and believed were being used elsewhere, for I will remark that I have seen several solidified specimens from extracts manufactured by others. The numerous experiments performed with small amounts I do not give, as experience taught me I could not depend upon them in the least as criterions of large batches, and even a brief notice of them will consume much valuable space in the Proceedings.

Until the year 1870 I made fluid extract of gossypium with dilute alcohol. My process was to moisten the finely-ground bark with the above-named menstruum, pack it into a cylindrical percolator, add dilute alcohol, and percolate until fourteen fluid ounces were obtained for each sixteen troy ounces of material; this amount was reserved and the percolation continued with a menstruum of the same strength until the bark was exhausted; the alcohol was then recovered from the last runnings by distillation, and the residue within the still evaporated until reduced to the measure of two fluid ounces for each sixteen troy ounces of bark operated upon, and then added to the reserved tincture.

The extract obtained by the above process is of a beautiful red color; upon standing it gradually becomes darker, at the same time depositing considerable sediment. Frequently it would be reported to me that a bottle of it had gelatinized, and in consequence of the abundant precipitation and the gelatinization so frequently occurring I considered the process very objectionable.

When the present Pharmacopœia was issued I was pleased to find that fluid extract of gossypium had received official recognition. The process recommended for its preparation differed materially from the one just described; a certain amount of glycerin was introduced. I immediately adopted the formula, resolving to give it as careful and practical an investigation as I was capable of and had facilities for doing. The addition of the glycerin made an extract a little thicker and somewhat sweeter than was produced by my old formula. The color was about the same. Precipitation occurred almost as abundantly as before, and occasionally I learned that a specimen had gelatinized. I was sadly disappointed, and after carefully trying the process twelve months from the time of its adoption, I felt that I was warranted in declaring it imperfect. Accordingly I abandoned the United States

Pharmacopœia and struck out for myself again. The line of experiment determined upon and adopted was as follows:

To every sixteen troy ounces of finely-ground gossypium bark used I made a mixture of alcohol ten fluid ounces, glycerin three fluid ounces, and water three ounces. After moistening the bark it was pressed firmly into a cylindrical percolator, and the remainder of the menstruum poured upon it. After disappearing it was followed with a mixture of alcohol, ten parts to six of water. The first thirteen fluid ounces of the percolate was reserved, after which the percolation was continued until the bark was exhausted. From this latter percolate I distilled the alcohol, and evaporated the residue to the measure of three fluid ounces, which was added to the reserved portion.

It will be noticed that but little change was made in the United States Pharmacopœia formula; perhaps to many the alteration was insufficient to justify a line of experiments, with careful observations and notes, for the period of fourteen months. However, experience has taught me that a slight change in the composition of a menstruum will in many instances make a decided alteration in the appearance of an extract. Consequently I felt authorized to faithfully investigate the subject, although I will candidly say my hopes of overcoming the aforementioned defects were very small.

The alcoholic strength of this extract was slightly greater than that of the United States Pharmacopœia. After the first part of the menstruum had been absorbed it will be perceived that I continued the percolation with a menstruum of the same alcoholic strength. This was an improvement. The extract resembled that of the United States Pharmacopœia, excepting that the precipitate thrown down by standing was much less in amount. I learned, however, from the travelling agent for the house, that in several instances he found it had solidified. Accordingly, after using the formula fourteen months, I again commenced with a new line of experiments. This time I did not use water during the operation.

Sixteen parts of finely ground bark was moistened with a mixture of alcohol ten parts, glycerin six parts.

After packing the bark into a percolator the remainder of the mixture was poured upon it; upon disappearing it was immediately followed with alcohol. Thirteen fluid ounces of the first percolate was reserved for every sixteen troy ounces of bark operated upon, after which the bark was exhausted (with alcohol), and the last runnings reduced by distillation to three fluid ounces. This was then mixed with the reserved thirteen fluid ounces.

The extract resembled, as far as appearances indicated, that produced by the United States Pharmacopœia formula. The gradual precipitation which occurs in almost all fluid extracts upon standing occurred in this also, but not so extensively as in the first two processes I have described. I have used the formula quite extensively since, and have yet to hear of the first instance of jellifying.

I am aware it is difficult to discover an infallible rule for making pharmaceutical preparations, one that will give satisfaction in all hands, and I can only report the result of my own experience. Accordingly, in answer to the part of my query, "Can a modification of the process for making this fluid extract be suggested which will prevent such a change (gelatinizing)?" I will say that practical experiments, extending over three years, according to the last-mentioned process, have been carried on in a manufacturing establishment that has turned out by the formula hundreds of pounds of the extract, and every pound, as far as my knowledge extends, remained unchanged.

"Has the bark of the green root any superiority over that of the dry in the preparation of the fluid extract?"

As a therapeutical agent cotton root has not enjoyed a very enviable reputation. It was first employed by negroes in our Southern States to produce abortion, reports saying it generally proved reliable. As its property of acting in this manner upon the female organs of generation became noised abroad, a demand sprung up for it over the entire country. Some physicians prescribed it as an emmenagogue, some as a parturient, and not a few disreputable persons undoubtedly administered it with the criminal object of producing abortions. Many physicians refused to prescribe it at all, inferring from reports that it was too violent in its action for safety.

When the subject was awarded to me by this society for investigation I had no faith in the virtue of gossypium or any of its preparations. I believed it to be worthless. I had manufactured quantities of the fluid extract of the dry bark, and never had received a favorable report from it or any extract made by other parties. I had conversed with practicing physicians who had used the extracts found upon the market, and had never heard a good word spoken for any of them, and I did not anticipate the green bark would prove an exception to the rule. After accepting the query from the Association I was in duty bound to throw aside all prejudices, and collect for the society all the FACTS I could in regard to the matter. I have tried to conduct the investigation strictly in an impartial manner. I have endeavored to impress the minds of physicians, from whom I have procured information relating to the subject, with the idea that if cotton root is worthless it should be discarded, if valuable the profession should understand the fact. My first move was to obtain all the information possible in regard to the employment of green gossypium in its native location, and I learned that it enjoyed the confidence of physicians as a reliable emmenagogue and parturient.

Soon after accepting the query in regard to this subject I received from Wallace Brothers, of Statesville, North Carolina, a half barrel containing forty-three pounds of prime fresh cotton-root bark preserved with alcohol. It was donated by them to help the investigation. This bark I proceeded to have ground as finely as possible, and then I made it into a fluid extract. The extract was all distributed to physicians with a request that an impartial, careful trial be given it, and the result of their investigation reported to me. I also requested each one to advise me of the success he had met with in using the fluid extract of dry cotton-root bark.

Much interest was taken in the matter, and reports were received by me from twenty physicians of different States, all agreeing that the tincture and other preparations made from dry cotton-root bark were worthless or unreliable as medicines, and in their letters there is not a single word spoken in favor of dry cotton root or any of its preparations. Quite a number of these reports came to hand before my extract of the fresh root bark had been distributed, enough, indeed, to discourage me with regard to the fresh bark, and lead me to believe that the reports upon my extract would be of the same nature. However, notwithstanding my convictions of the worthlessness of gossypium in any form as a medicine, I proceeded to carefully prepare the forty-three pounds of fluid extract from the fresh bark and distribute it to practicing physicians over the country. I made a special request that each physician would carefully watch its action, and report to me either in regard to its value or worthlessness. I emphasized the point that I would prize reports saying it was inert fully as much as I would those to the contrary. I endeavored to impress their minds with the fact that the investigation was for the benefit of science and the medical profession at large, and not a personal affair of my own.

In regard to my fluid extract of the fresh bark I have received many letters, some of them quite long and explicit with details, and, with the exception of one or two, all speak in terms of praise of the promptness with which the fluid extract of fresh cotton-root bark acted.

Members will please remember that my investigation is only with respect to the comparative values of fresh and dry cotton-root bark, being simply for the purpose of discovering if fresh bark is superior to dry in a therapeutical sense. I am not expected to report upon doses and enter into the minutiæ of symptoms, and have confined myself strictly to the point under consideration. Upon comparing the reports, I find that dry bark is universally condemned as worthless. Not a single word is spoken in its favor. With respect to the fresh bark, nineteen of twenty-two reports are decidedly flattering. Accordingly, I will report from testimony obtained through my investigations, that a prime fluid extract of fresh gossypium commends itself to the medical profession as a therapeutical agent, and deserves to be farther investigated. The dry bark and its preparations I believe to be inert and worthless. Another point I wish to call attention to is, with regard to the reputed power of extract of cotton root for producing abortion. In the communications from two physicians writing from the South, they say, *large amounts* of the fresh decoction will undoubtedly produce abortion. In consequence of the alcohol in a fluid extract, it will be almost impossible to administer excessive quantities of this preparation. One report mentions where it was given quite a time in a case of conception without ill effect. In another instance it was administered without effect to produce abortion where a lady was afflicted with contracted pelvis, and it was advisable to prevent the dangers incident to childbirth. Consequently I feel that the fluid extract of fresh gossypium is a safe remedy to put upon the market, as I do not believe it can be given in quantities sufficiently large to warrant its use by disreputable persons for criminal purposes. This is a pleasant conclusion for the conscientious manufacturer to arrive at, for certainly it is not agreeable to think we are putting a medicine upon the market that will further this most terrible, and, I fear, too common crime.

"*To which principle*," etc. I have experimented some in regard to this point, but am unable to report that I have discovered anything definite. Owing to the fact already stated that disintegration of the fluid extract occurs unexpectedly and only occasionally, I find it a difficult matter to pursue an investigation or to experiment upon the subject with any degree of satisfaction. I am inclined to differ with some who have written upon the subject. I believe the solidification results from a rearrangement of the constituents of the extract, and does not result from pectic fermentation. The solidified portion does not behave as does jellified fluid extract of senega and chionanthus v., and pectin itself, and I believe it will eventually be demonstrated that the trouble arises from the action of soluble astringent principles upon other soluble constituents of the bark resulting in the formation of new substances of an insoluble character. I am strengthened in this belief by observing that the extracts I have seen, which will occasionally solidify, are senega, chionanthus v., cinnamon, gossypium, geranium mac., sumac, and kino.

The first two named contain much pectin, and depend upon pectic fermentation for their solidification. The others are rich in vegetable astringents, and after the change the liquid filtered from the solid portion is found almost free from astringency; the solid matter resembles very much as far as appearances indicate impure freshly precipitated tannate of hydrastia and so forth.

True it is that cinchona bark, nutgalls, and some other vegetable substances contain an abundance of vegetable astringents, and extracts prepared from them will remain permanent, but may it not be that while rich in astringency they are devoid of the other principle? May they not lack the extractive substance necessary to combine with the astringent principle for the production of the insoluble material?

"*To what influence*," etc. Fluid extract of gossypium, cinnamon, chionanthus, geranium mac., and senega will occasionally solidify when made of dilute alcohol. I have never known either of them to do so if alcohol only is used, consequently I feel that I may say water is the mischief-maker. Either by dissolving some substance insoluble in alcohol, or by influencing the decomposition of materials soluble in both menstruums, it undoubtedly produces the objectionable alterations, but we are not at liberty to increase the alcoholic strength of fluid extracts that are officinal for fear serious consequences may result, and it will be observed, my formula for fluid extract of *dry* gossypium contains glycerin instead of water, leaving the alcoholic strength of the preparation about that of the

U. S. P. I feel certain an extract prepared with alcohol only will remain permanent, but for reasons above stated we are debarred from using this menstruum undiluted, unless authority is given by our Pharmacopœia.

It was reported to me from good authority, that in a certain city, retail druggists complain that fluid extract of gossypium *invariably* gelatinizes in a few weeks after being placed upon the shelf, and I infer from the teachings of my experiments that the city named is a temperance place, and manufacturers of pharmaceutical preparations are endeavoring to assist the good cause by lessening the amount of intoxicating liquor in the extracts they are making.

In conclusion, allow me to extend my sincere thanks to physicians who have aided me with experiments and reports, to Wallace Brothers for their donation of fresh bark, and to Prof. John M. Scudder for the kind notice he gave the work in his journal.

ON SQUILL.*

BY EDWARD D. CHIPMAN, PHILADELPHIA.

QUERY 18.—The ground bulb of Scilla maritima when moistened with diluted alcohol and worked with the hands causes for a time an intolerable itching. To what principle in the bulb is this effect to be ascribed?

To determine the above question, having selected fresh and green bulbs of the plant, I employed the process of Labourdais to isolate the "scillitin," varying the plan suggested by him so far as to evaporate the alcoholic solution by water-bath, the resulting "scillitin" being solid with crystalline tendency, very bitter but not acrid. Its alcoholic solution applied to the skin produced no effect.

I next powdered finely the dried bulb of the plant, and having packed firmly in a percolator, exhausted it with strong alcohol until it passed through the percolator free of bitterness. Having evaporated it to the consistence of an extract, I treated the latter with boiling water, which dissolved out the intensely bitter principle, tannic acid, and an orange odorous acid coloring matter. The bitter principle was free from acrimony. The oleo-resinous matter left after treatment with the boiling water was soluble in ether, very soluble in cold alcohol, and imparted its stinging pungency and acrid taste.

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* Read at the Fifth Session.

Finally, the finely powdered dried bulb was exhausted with petroleum benzin, the product evaporated, leaving the oleo-resinous matter of a brown color, and possessing in a marked degree the acrid principle of the plant, but free from its bitterness.

In conclusion, I believe with "Tilloy," in the existence of two active principles in squill, one yellow and bitter, and the other a resinoid, very acrid, to the latter of which is due the itching and tingling sensation when applied to the skin.

THE DETECTION OF ADULTERATIONS OF OLEUM THEOBROMÆ.*

BY GUSTAVUS RAMSPERGER.

QUERY 44.—There is reason for believing that our oleum theobromæ is largely adulterated. How can the adulterations be detected, and to what extent do they exist?

THE answer to this query is somewhat difficult, as there seems to be no perfectly reliable criterion by which to distinguish the adulterated cacao butter from the pure. The statements in the books of reference are conflicting, and differ in essential points. The U. S. Pharmacopœia gives no test for purity, neither does Wood & Bache.

The Pharmacop. German, says: "Sit e subflavo album, odoris exigui proprii, saporis mitis, sebo ovillo rigidius, calore 30° liquescens."

The Pharmacop. of Würtemberg puts the melting-point at 40°, the specific gravity at 0.89–0.91. The Pharmacop. Belgique gives as the density 0.810.

Dorvault's Pharmacie legale gives the melting-point as at 24–25° C., and directs that ether be used for detecting adulterations, pure cacao butter being easily dissolved in 2 parts of ether at common temperature, the solution remaining clear, while when it is adulterated with tallow or wax, the solution becomes turbid.

Fehling's "Handwörterbuch der Chemie" gives similar directions, and adds that if the solution gets turbid at 0° in less than ten minutes, the cacao butter is adulterated, "the solution of pure cacao butter shows turbidity only after ten to fifteen minutes, such turbidity disappearing again at 19–20° C."

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* Read at the Sixth Session.

According to Hager, the pure cacao butter is soluble in 6 parts of anilin, and from the clear solution the pure cacao butter separates as a clear liquid layer; if the cacao butter contains tallow, then crystals and grains will separate.

Gmelin gives the specific gravity as 0.89–0.91, and the melting-point at 29–30° C.

Klenke in his "Verfälschung der Nahrungsmittel," puts the melting-point at 24–25° C., that of beef tallow at 30°, of mutton tallow at 35°, and of ox marrow at 37°, but considers the melting-point as no sure criterion. He says that drops of pure liquefied cacao butter dropped into warm water remain more or less globular, but if the cacao butter is adulterated with animal fat, the drops flatten, assuming a lenticular or discoid shape.

Muspratt gives the specific gravity as 0.90, but thinks it is not a test of purity.

The "American Journal of Pharmacy" (vol. xxiii, p. 16), gives the melting-point at 76° F., the congealing-point at 60° F.

Mr. Henry W. Lincoln, of Boston, in a very interesting essay on this subject in the Proceedings of 1867, mentions also the test of dropping the cacao butter into warm water, and further says: "The best test, however, for any adulteration of cacao butter, is a cultivated taste, such as is only acquired by practice, similar to that employed by dealers in teas and wines, and can hardly be described. The point of fusibility is its first distinction. Bitten and placed on the tongue, it melts quickly and leaves no harsh taste, which it always does when adulterated with wax, spermaceti, tallow or stearin. Dropped on a warm iron it gives out its odor, and if adulterated largely, the peculiar odor of the article with which it is adulterated will be prominent. There is no doubt that it is sometimes largely adulterated, but although the writer has procured samples from various sources, he has not been able to find any that seems to be adulterated to any great extent, and he is confirmed in this by Dr. Hayes of Boston."

Dr. Squibb, in a discussion about suppositories during the convention of 1870, makes a rather sweeping statement in saying "all the cacao butter which is made is adulterated."

Hager & Jacobsen's "Industrieblätter," recommend the following method for the discovery of adulteration of butter: The butter is formed into candles, these are lighted, and then the light blown out, when an adulteration by tallow will be discovered by the smell. This is a more troublesome, and as I found out by experiments, not more reliable test than the dropping on hot iron recommended by Mr. Lincoln.

This is now about all the information of any importance which I could gather as a guide to find out the best test for the purity of oleum theobromæ.

My experiments I began by preparing a quantity of pure cacao butter from Caracas beans by three different methods: expression, extraction by ether, and by bisulphide of carbon. The extraction by ether is less practical than by bisulphide of carbon, the former extracting with the fat a purple-colored matter, while the latter extracts the oil only.

To these three different portions of pure cacao butter I applied some of the above-mentioned tests. In point of solubility in ether, and also in anilin, I found all three alike; not so, however, in their specific gravity and fusibility. The specific gravity of the first was found to be 0.850; of the second, 0.970; and of the third, 0.958. This great incongruity shows the unreliability of the specific gravity test. The melting point of two specimens I found 31–32° C., of the other 33–34° C.

Pure cacao butter dissolves easily within a few minutes at common temperature in 2 parts of ether, forming a clear solution, which sometimes separates after standing for awhile into two clear layers, the heavier layer (having the greatest bulk) being the larger one.

My experiments with butter of cacao and anilin (anilin from two different factories) gave a different result from that indicated by Hager. I found 1 part of butter of cacao soluble in 2 parts of anilin (not in 6 parts only), but the solution neither in the first mentioned nor any other proportion ever separated into two layers. It is clear, but when concentrated somewhat thick like very thin jelly. For the reason of this jelly-like appearance of the concentrated solution anilin is not quite so good a test for adulteration of butter of cacao with paraffin; the latter is a little soluble in anilin, the solution or mixture having a semitransparent gelatinous appearance. In ether paraffin is not soluble at a temperature below 40° C. At this temperature ether makes a perfectly clear solution, which at 35° C. congeals, and even diluted with 10 parts of ether forms a homogeneous, somewhat crystalline, and solid magma.

Having tested the pure ol. theobromæ, I made mixtures in different proportions of it with several animal and vegetable fats, as beef and mutton tallow (freshly rendered and old), ox marrow with beeswax, Japan wax, Myrica wax, and spermaceti, and also with paraffin; then made solutions of them with different solvents, as ether, anilin, chloroform, bisulphide of carbon, oil of turpentine, and absolute alcohol, and subjected the mixtures and some of the solutions to the above-mentioned tests. As a result of this great number of experiments I found that none of these tests are infallible, but that several taken together would be a tolerably sure indication of the purity or adulteration of oleum theobromæ.

The best test I found to be ether. It indicated all admixtures which I had made to the cacao butter, with the exception of ox marrow, either directly by the turbidity of the solution of 1 part of the adulterated cacao butter in 2 parts of the ether (as is the case with the adulterations by tallow, bees- and bayberry-wax, and paraffin), or if not immediately after solution, then by becoming turbid after standing for some time, and by formation of little crystals and grains at the spontaneous evaporation of the solution, which crystals are not soluble again in 2 parts of ether at common temperature (this is the case with Japan wax and spermaceti with or without the addition of ox marrow). Anilin shows adulterations with tallow and wax almost as well as ether. The other above-mentioned solvents cannot be used as tests; all the different fats and wax being easily soluble in them, with the exception of bayberry wax, which with chloroform only makes a clear solution.

Next to ether and anilin the taste seems to be the most reliable test. The dropping on hot iron or burning the mixtures with wicks, does not show plainly enough an adulteration with 25 per cent. of tallow, and of freshly rendered beef tallow even 50 per cent. could hardly be recognized. With Klenke's test I did not succeed; I was very seldom able to see any difference in the shape of the drops of cacao butter from that of tallow or ox marrow drops on water, the former expanding dish-like over the surface of the warm water about as much as the latter.

The specific gravity test is unreliable, as I have shown already. The same seems to be the case with the point of fusibility as a test; at least I found out that recently melted and recongealed cacao butter melts at a temperature several degrees lower than such as had been melted several weeks before. This may account for the conflicting statements about this point.

Guided by the result of the experiments made, I examined a dozen specimens of oleum theobromæ, which I had collected in different wholesale and retail stores. The result was as follows:

	Specific gravity.	Melting-point.	Taste.	Solution in ether or anilin.
No. 1, . .	0.850	31° C.	Pure.	Clear.
" 2, . .	0.897	33° C.	Pure.	Clear.
" 3, . .	0.900	31° C.	A little rancid.	Clear.
" 4, . .	0.874	30° C.	Pure.	Clear.
" 5, . .	0.976	34° C.	Not quite pure.	Turbid.
" 6, . .	0.938	32° C.	Pure.	Clear.
" 7, . .	0.979	34° C.	Very little rancid.	Clear.
" 8, . .	0.875	34° C.	Strongly rancid.	Very turbid.
" 9, . .	0.978	30° C.	Pure.	Clear.
" 10, . .	0.872	35° C.	Pure.	Very little turbid.
" 11, . .	0.919	33° C.	Pure.	Clear.
" 12, . .	0.959	30° C.	Rancid.	Clear.

This shows two or three adulterations among the dozen, one of them with tallow plainly recognizable.

In concluding, I must confess that the result of my labors is not quite satisfactory, because I did not succeed to find a sure test to distinguish ox marrow from cacao butter in the mixtures, but I shall continue my researches, and communicate the result, if any, at some later time.

New York, September, 1876.

MICHIGAN OPIUM.*

BY JOSEPH P. REMINGTON, PHILADELPHIA.

The writer received a few days ago a package from a friend in Kansas bearing the above novel title. The sample was accompanied by a letter requesting an examination of the opium, as it had been offered for sale. The box, on being opened, revealed a rather soft mass of extractive consistence wrapped in tin-foil. The odor of the mass was not particularly narcotic, but resembled that of extract of lettuce. When torn apart it was destitute of the shining tears usually seen in Smyrna opium; no fragments of capsules were visible, and it was not at all bitter to the taste. Its color was a very dark greenish-brown.

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* Read at the Seventh Session.

An assay by Flückiger's method was now made: 5 grams of the opium were dried carefully by a water-bath heat until it ceased to lose weight, and then weighed 3.82 grams, thus showing 24.6 per cent. of moisture. This was then reduced to powder, mixed with double its weight of pumice-stone, packed in a percolator, and boiling ether poured upon it to extract waxy matter, narcotina, etc. A small quantity of alcohol .822 was then poured upon the powder, and then about 100 c.c. of water allowed to percolate through the mass. The percolate came through highly colored, and when the powder was exhausted the liquid was treated with ammonia, in order to precipitate the morphia. After standing several days no precipitation took place. The liquid was then concentrated, and again allowed to stand, but no precipitation took place; it was wanting in bitter taste, and in doses of a teaspoonful devoid of narcotic effect.

From the results of this examination the writer is led to conclude that Michigan opium is not likely to unsettle the present values of this now indispensable drug, and though positive information is wanting at this time as to the exact source of the so-called "opium," yet it very closely resembles a specimen of Vermont opium produced by W. C. Wilson in 1869. This latter was proved by Prof. Procter's analysis to contain 0.90 and 0.40 per cent. of morphia in two cases, and none whatever in the third case, and the writer is led to suspect that this Michigan opium is made in the same way as the so-called Vermont, *i. e.*, cutting the plants down, bruising with a little alcohol for preservation, and subjecting to pressure; evaporating the liquid so obtained to the soft mass as above described.

Steps have been taken to trace this specimen up, in order to have its history complete, for the author of this should certainly be exposed.

Ninth Month, 5th, 1876.

III. CHEMISTRY.

ON THE MANUFACTURE OF CHEMICALS IN THE UNITED STATES.*

BY ADOLPH W. MILLER, M.D., PH.D.

QUERY 36.—What progress has been made in manufacturing important medicinal chemical preparations within the last few years, which formerly were exclusively imported?

THE very nature of the above query precludes the possibility of a satisfactory answer, excepting with the co-operation of the more important manufacturers of the preparations alluded to. As no reply to this query was received last year, when it was in charge of one of our members, who is probably the best qualified to answer it exhaustively, the writer felt convinced at the outset that his search for information would be beset with many difficulties. Being desirous, however, of making at least an honest effort to furnish an answer, no matter how meagre it might prove to be, the following explanatory circular was issued and mailed to all of the leading chemical and pharmaceutical manufacturers of the United States, whose addresses could be ascertained.

PHILADELPHIA, February 15th, 1876.

DEAR SIR: The American Pharmaceutical Association desires an answer to the following question:

"What progress has been made in manufacturing important medicinal chemical preparations within the last few years, which formerly were exclusively imported?"

You are therefore respectfully invited to contribute any information that you may be possessed of, having a bearing on this subject. It will be unnecessary to state that no one is expected to furnish any knowledge of such a nature that its publication would prove detrimental to his pecuniary interests; the object is rather to obtain any facts in relation to the matter that may prove to be of interest to the great body of intelligent American pharmacists.

Replies on the following points are specially desired:

1st. Enumeration of important medical chemicals produced by your firm.

2d. Enumeration of those chemicals which you have either discovered or first produced in this country.

3d. Statistical information in relation to the amount annually disposed of.

4th. Ability to compete with foreign manufacturers in price and quality.

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* Read at the Seventh Session.

5th. Details of manufacture, whether made by the processes of the books or by improved manipulations.

The facts elicited in this manner will most probably be published in the next volume of the Proceedings, and attention will thus be directed to those furnishing information.

It is confidently hoped that you will prepare answers to at least a portion of the questions proposed; you will please address the same, etc.

In addition to sending out the above circulars, a number of the resident manufacturers were personally visited by the writer, for the purpose of explaining more fully the object and scope of the query. The special aim of this document was to present the case fairly, and at the same time to relieve the minds of the manufacturers of the unpleasant impression that our Association was endeavoring to pry into their trade secrets. The writer feels some humiliation in stating that out of thirty-eight manufacturers addressed, only six favored him with an acknowledgment.

As the replies received are so few in number, and as they are chiefly in direct response to the questions proposed in the circular, it was deemed unnecessary to present them in a compact tabulated form, and an abstract of each answer will therefore be given.

Messrs. Charles Pfizer & Co., of New York, state that in addition to a large number of chemicals and pharmaceutical preparations enumerated on their price-list their most important products are tartaric acid, refined borax, refined camphor, chloroform, cream of tartar, ethers and mercurials of all kinds, bromide and iodide of potassium, Rochelle salt, santonin, and strychnia. They have first introduced into this country the manufacture of refined borax, cream of tartar, iodide of potassium, and santonin. Most of the articles mentioned are now manufactured in this country exclusively at a degree of perfection equal to the best foreign makes, and at prices below the cost of importation, thanks to the moderate protection enjoyed under the present tariff. They have perfected improved manipulations in the refining of camphor and in the manufacture of tartaric acid, cream of tartar, and Rochelle salt.

Professor Emil Scheffer, of Louisville, Ky., kindly furnishes the following information and statistics relating to pepsin, with which his name has been so long and so intimately connected. He is the discoverer of an easy and simple method for the preparation of this valuable remedial agent, by means of which a reliable and stable product is obtained. His sales have constantly increased from the time he first introduced the saccharated pepsin into the market, five years ago. In 1875 about thirty thousand ounces were disposed of, and the sales of this year so far fully equal those of last. He is quite confident that any manufacturer of pepsin by his process can readily compete with foreign manufacturers. The essential parts of the process are still the same as published by him in 1872. Continued practice and experiments have necessarily suggested modifications, by means of which a purer product is realized.

Harrison Brothers & Co., of Philadelphia, have furnished an exhaustive description of their various extensive establishments. They manufacture, chiefly for technical purposes, sulphuric, nitric, muriatic, acetic, and pyroligneous acids; alum, copperas, acetates of lead and lime, sulphate of soda. Also, on a large scale, white or carbonate of lead, muriate of tin, and a full line of painters', lithographers', and paper-stainers' colors, in pulp, in oil, and dry. John Harrison, the founder of the firm in 1793, was the first to manufacture sulphuric acid in the United States. He and his successors were the first to manufacture wood products, from the destructive distillation of wood, in America. These comprise pyroligneous acid, red liquor and iron liquor (acetates of iron and alumina), brown or pyrolignate of lead and white sugar of lead. The firm is unable to compete with the cheap labor and low interest of the foreign manufacturers. They can compete with and even excel the foreigner in quality, but they are unable to rival them in cost of production. Their manufacturing details have been partly obtained from books, but they are chiefly based on improvements of their own. An interesting account of the early days of this establishment will be found in Freedley's "Philadelphia," a work devoted to the manufacturing interests of this city, of which the following is an extract:

"The manufacture of chemicals in the United States may be said to date from the war of 1812. The commercial restrictions that preceded that war caused such a scarcity and dearness of chemicals that the preparation of the more prominent articles offered an attractive field for enterprise. Previous to that period, however, a Philadelphian had established successfully a manufactory of sulphuric acid; this was Mr. John Harrison, the first successful manufacturer of oil of vitriol in the United States, and the founder of the well-known house of Harrison Brothers & Co., the present proprietors of the 'Kensington' and 'Gray's Ferry' chemical, white lead, and color establishments. He had spent two years in Europe in acquainting himself, as far as he could gain access to them, with the processes used by chemists, and after his return to America devoted himself to the manufacture of chemicals. How much earlier he succeeded we have no means of ascertaining, but in 1806 he was fully established as a manufacturer of oil of vitriol and other chemicals in Green Street above Third. So successful were these operations, that in 1807 he had built a leaden chamber, eighteen feet high and wide and fifty feet long, capable of making 3500 carboys per annum. The price which the acid then brought was fifteen cents per pound. The first application of platinum to the concentration of sulphuric acid was also first attempted in Philadelphia by Dr. Erick Bollman; he had brought from France the method then lately discovered by Dr. Wollaston for converting the crude grains into bars and sheets, and in 1813 he had reduced it into masses weighing upwards of two pounds, and into sheets more than thirteen inches square. One of the first uses to which he applied these sheets was the making of a platinum still for John Harrison for the concentration of his oil of vitriol. This early application of platinum is highly creditable to the American manufacturer, as its use for this purpose was then a novelty in Europe."

Mellor & Rittenhouse, of our city, reply, in answer to the circular of inquiry, that they were the first to manufacture successfully in this country, on a commercial scale, a pure extract of licorice in sticks directly from the root. The extract, which they are now making, compares favorably with the best Calabria brands in quality, purity, flavor, and appearance, while it is furnished by them at a much lower rate. They were enabled to establish this branch of industry solely by the present rate of tariff on the foreign article, and with continued protection they are confident of being able to maintain it.

The Pennsylvania Salt Manufacturing Company, having their works at Natrona and Greenwich, both of this State, have forwarded a number of elaborate pamphlets, containing a mass of information in relation to the chemicals produced by the company. Contrary to the usual custom of chemical manufacturers, the writer was cordially invited to inspect any or all of their works, and to study the various processes resorted to, which invitation was gladly availed of in a hurried visit to the works at Greenwich Point in Philadelphia. The company here have six acres under cover, with a capacity for turning out one and a half million dollars worth of goods per annum, while at Natrona they have twenty-five acres under cover, and are able to produce three million dollars worth annually. They furnish the following table of their weekly manufactures:

Caustic Soda,	125,000	pounds	per week.
Sal Soda,	450,000	"	"
Bicarbonate of Soda,	200,000	"	"
Alumina,	40,000	"	"
Saponifier,	2400 cases of 48 pounds each		"
Oil of Vitriol,	1,000	carboys	"
Muriatic and Nitric Acids,	200	"	"
Copperas,	100	barrels	"
Porous Alum,	250,000	pounds	"
Lump Alum,	100,000	"	"

As pharmacists, we are, of course, chiefly interested in the sodium bicarbonate, of which they produce two varieties, one obtained from soda ash, and the other from cryolite. The various analyses so far made by disinterested parties, including our own members, Prof. Bedford, as well as Prof. Mahla, of Chicago, and Falkenall & Ruse, of San Franciscò, are highly creditable. They demonstrate emphatically that both of the above brands are superior in quality to all the imported varieties. The employment of cryolite as a basis for manufacturing this chemical seems to offer facilities for reaching a standard of purity that is unattainable in any other manner. As the company not only competes with, but even undersells, the inferior English bicarbonate, there appears to be every probability that this will soon be banished from our markets. Even now it is rarely asked for, excepting by antiquated bakers and brewers, who find it difficult to divest themselves of the deep-rooted prejudice in favor of those materials that come the greatest distance, even in direct preference to superior home productions.

The writer has been favored with the following carefully prepared and highly instructive reply, from the able pen of Mr. Alexander H. Jones, answering on behalf of Powers & Weightman:

Dear Sir: In regard to the progress made of late years in the manufacture of chemicals, formerly exclusively imported into this country from abroad, I may say that it is due, to a great extent, to the fact that crude materials have been made free of duty, while protective duties have been maintained upon the manufactured products. There are certain exceptions to this, but a great deal has been due to the circumstance named.

For example, in 1861, the duty on crude iodine was 10 per cent.; the duty on resublimed iodine was 15 per cent. Subsequently, and until 1870, the duty on crude iodine was made 50 cents per lb.; the duty on resublimed iodine was made 75 cents per lb.

Up to that period (1870) the protective duty on the resublimed article was so insignificant as to offer no encouragement to resublime iodine here, while the duty on the crude material prevented the manufacture of iodide of potassium on a large scale.

In 1870, crude iodine was made free, and the duty retained on the resublimed iodine and on iodide of potassium.

Since then the home demand for both resublimed iodine and iodide of potassium, and also for the minor preparations of iodine, have been fully met by American manufacturers.

In France, as you are well aware, iodine is produced largely from kelp, obtained from the seaweeds gathered on the French coast, and the manufacturers there have this advantage, and besides have had many years of experience as well as cheaper labor. The duty on iodide of potassium is 53 cents per lb. (600 fr. per 100 kilos. net) if imported into France from non-treaty countries.

The fact that iodide of potassium is made here in such quantities as to supply the entire wants of our own people is explained by the statement that we have free iodine and a protective duty on the finished product.

With free iodide of potassium here, and a protective duty of 53 cents per lb. in France, the industry would cease here, and this market would be supplied from France or other European countries.

Bromine is largely produced here, and bromide of potassium made in such quantities as to meet the home demand, and occasionally some is exported. The crude material being made here so extensively, and offered at reasonable figures, explains why we are no longer dependent upon foreign manufacturers for these articles, which some years ago came here from abroad, and commanded much higher prices than is now asked for the American product.

Citric acid is made here largely, and supplies the home demand. It is made by one firm only, Messrs. Powers & Weightman. The experiment of engaging in this enterprise was a hazardous one.

Lime or lemon-juice is subject to 10 per cent. duty, and citric acid is protected by a duty of 10 cents per lb. The protection is practically *none*. The French manufacturers enjoy a great advantage in having the crude material near at hand.

The American manufacturers are not as well situated in this respect, and besides pay higher wages, have heavier business expenses, taxes, etc., and labor under constant fear of changes in tariff legislation, which recently threatened to remove the duty on the citric acid, while retaining that on the lemon or lime-juice.

Although lemon-juice is to be had in and near France, the French government imposes on American citric acid a duty of 16 cents per lb. (180 fr. per 100 kilos. net).

At times the present rates of duty give the American manufacturers of citric acid a slight protection; at others none at all.

When citric acid ruled at 4*s.* per lb. or $1 gold, abroad, the duty of 10 cents per lb. was equal to 10 per cent., and the duty on the lemon-juice being 10 per cent., there was no protection.

In the case of this article, citric acid, the American manufacturers hoped to encourage the people of the South to concentrate the lemon- or lime-juice, whereby a new home industry would be established in a section of our country greatly needing assistance, and ultimately an abundant supply of the crude material be obtained without resort to foreign countries. This hope has been but partially realized.

To make citric acid free and retain the duty of 10 per cent. on the juice, would kill this industry at once. As it is there is but slight encouragement. To bring in French citric acid free, while France imposes 16 cents per lb. on the American, is called by some freedom of trade, and this is now proposed by the present Congress.

The manufacture of this or any article here, of course adds to the general competition and tends to reduce prices, while securing labor to our own people and affording supplies on the spot ready for emergencies, and in the hands of well-known manufacturers.

The effects of competition on prices is illustrated in the case of iodine and also in that of bismuth. Prices for both articles were reduced as soon as the South Americans furnished them in large lots.

The absence of stability in legislation is a continued source of annoyance to the manufacturers of this country. It is very different abroad. In France the duty on citric acid in the general tariff is by the act of July 2d, 1836, forty years ago.

In this country since 1842 (a less period), the rates have been, 20 per cent., 4 per cent., 20 per cent., 10 cents per lb., and changes contemplated at almost every session of Congress.

It is considered by many well-informed persons that with greater certainty of stability, almost every chemical product could and would be made here, and that in a reasonable time we could compete with manufacturers abroad. As it is some heavy chemicals are not made here at all; and of the alkali exported from Great Britain to all countries, more than one-third is sent to the United States. Thus, for the seven months ending July 31st, 1876:

	Cwts. 1875.	Cwts. 1876.
To Russia,	167,178	191,139
" Germany,	421,654	512,116
" Holland,	211,676	231,900
" France,	76,650	124,025
" United States,	1,147,138	1,190,117
" other countries,	692,868	755,566
Cwts.,	2,717,164	3,004,863

Chlorate potassa, bleaching powder, soda ash, etc., are not likely to be made here under existing circumstances.

Tartaric acid is made in the United States largely, and the foreign is seldom met with here.

Since crude argols were made free the home demand is met by American manufacturers.

In regard to discoveries made here, there is but little to be said. It may not be amiss however to refer to the precision with which the alkaloids of the cinchona barks are now separated.

Cinchonia, cinchonidia, quinidia, quinia, are now most accurately determined, and each alkaloid produced with the greatest regard to purity and care as to separation.

Of late years, indeed, quite recently, attention has been especially directed to the salt (sulphate) of cinchonidia. Its value is said by many to be fully equal to quinia (sulphate).

It has now been well introduced and is employed largely, substituting quinia to a great extent. The price is less than one-third (at present about one-fourth) that of sulphate quinia. It is frequently given in doses same as quinia, and produces equally good results.

The advantage to the people at large in thus having an abundant supply of this valuable alkaloid produced at home, and offered at such low prices, can hardly be overestimated.

Yours truly,
A. H. JONES.

In conclusion, the writer cannot forbear expressing once again a feeling of disappointment and deep regret that he was not furnished with more abundant materials for the purpose of preparing the present paper. It is to be hoped, that as we advance in civilization, we may all gradually learn to cherish kindlier feelings towards our professional brethren, and thus gradually divest ourselves of selfish and uncharitable notions, that savor so strongly of the religious mysticisms of the dark ages.

PHILADELPHIA, September 5th, 1876.

ARSENIC IN PHOSPHORUS.*

BY LOUIS DOHME.

QUERY 26.—The phosphorus of commerce is often contaminated with arsenic. In what proportion is it present in the various brands of phosphorus found in the American market?

ON inquiry among the dealers in and consumers of phosphorus, I learned that only two brands of phosphorus are now sold in this market. One of these is made by Gibbs & Deacon, of Mount Holly, N. J., who according to the statement of Messrs. Rosengarten & Sons, of whom I obtained the article, are the only makers in this country. The other brand is manufactured by Albright & Wilson, of Oldburg, England, a pound package of this article having been kindly purchased for me from their New York agents by Prof. Bedford. Besides these two I examined a third sample, taken from a ten-pound can, being part of the stock of a former match factory in Zanesville, Ohio. Although my informant could not definitely name the manufacturer of this article, he sent me a yellow metal stamp, bearing the letters "A. & W." on it, which stamp had been taken off a can of the same lot of phosphorus. I learned since that this stamp was formerly the trademark on the cans of phosphorus made by Albright & Wilson, Oldbury, England, and this sample, No. 3, no doubt represents the condition of some of their phosphorus of several years ago.

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* Read at the Fifth Session.

To determine the percentage of arsenic, a weighed quantity of phosphorus was heated with diluted pure nitric acid, until completely dissolved, the excess of nitric acid being finally driven off by heat. A stream of hydrosulphuric acid was now for some time passed through the phosphoric acid, which had previously again been somewhat diluted, and which was allowed to stand for forty-eight hours thoroughly saturated with the gas. The precipitate, if any, was then collected on a filter, thoroughly washed with water to remove all traces of phosphoric acid, finally placed in a flask along with the filter, and heated with strong nitric acid, with addition of some chlorate of potassium, until a clear solution was obtained. This was neutralized with ammonia in excess, filtered, and a clear mixture of sulphate magnesium, chloride ammonium, and ammonia added as long as a precipitate was produced. The mixture having been allowed to stand over night, the crystalline precipitate of arseniate of magnesium and ammonium was collected on a weighed filter, carefully washed with a mixture of three parts of water and one part of ammonia, dried at a temperature of 110° C. till the weight became constant, and weighed.

The following is the result of the analysis of the above three samples of phosphorus:

No. 1 (Gibbs & Deacon). Gave no precipitate with hydrosulphuric acid, nor did Marsh's test reveal even traces of arsenic.

No. 2 (Albright & Wilson). 500 grains yielded in the above manner 0.462 grm., $2MgO,NH_4O,AsO_5HO$, containing 0.1823 grams As, equal to 2.8128 grains, or 0.562 per cent. of metallic arsenic.

No. 3 (A. & W.). 500 grains phosphorus yielded 0.876 grm., $2MgO,NH_4O,AsO_5HO$, containing 0.3457 grm. As, equal to 5.3341 grains, or 1.066 per cent. metallic arsenic.

BALTIMORE, August, 1876.

IMPURITY OF TARTARIC ACID.*

BY JOSEPH WILLIAMS, WORCESTER, MASS.

QUERY 24.—To what extent does sulphuric acid occur as an adulteration or accidental impurity in tartaric acid?

SAMPLES of powdered tartaric acid, to the number of sixty-two, were collected from various parts of the country, and they may be

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* Presented at the Fifth Session.

fairly taken as representing the average quality of that article sold. The barium chloride test was selected as giving the most satisfactory results.

The lead acetate test, as mentioned in the United States Pharmacopœia, might be advantageously accompanied by the statement that lead acetate gives a precipitate with *pure* tartaric acid, and so distinct is this reaction that, with solutions of known strength, I was able to detect the presence of $\frac{1}{100}$th grain of the latter. The *pure* acid was prepared from the best crystallized by five crystallizations from distilled water, only the first deposit of crystals being used for the subsequent crystallizations. With *pure* tartaric acid barium chloride gives no reaction.

In testing the samples above mentioned, solutions of the following strengths were used:

Barium Chloride,	1 part.
Distilled Water,	10 parts.

Tartaric Acid,	1 part.
Distilled Water,	50 parts.

The entire sixty-two samples were tested three separate times with every possible precaution. Three samples showed complete absence of sulphuric acid, while fifty-nine gave unmistakable evidence of its presence. The whole were again examined without any change of result. From this it appears that 95 per cent. of the commercial powdered tartaric acid contains traces of sulphuric acid, but in such small quantity as to suggest a slight deficiency in the process of purification, rather than any attempt at deliberate adulteration.

AMMONIACAL GLYCYRRHIZIN.*

BY HENRY N. RITTENHOUSE.

The property of licorice root or its preparations, of masking the taste of bitter or otherwise nauseous medicines, has been known for a very long time, and for this purpose has found a place in some of the officinals of our own and other Pharmacopœias. In the attempt to render medicines palatable, in these days of elegant pharmacy, this valuable, though old, remedy seems to have been overlooked almost entirely.

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* Read at the Fourth Session.

The sweet principle of licorice root, or glycyrrhizin, is no doubt the active agent that gives the root its peculiar property, and the object of this paper is to call attention to its combination with ammonia, which presents it in a very desirable form for use in any way that it may be required.

An article published in the "American Journal of Pharmacy" for September, 1875, copied from a paper read before the Pharmaceutical Society of Paris in June previous by Z. Roussin, gives an account of this preparation, its method of manufacture, and its properties. Following the methods of this author in the main, we have repeated his process, without, however, refining the resulting preparation by resolution in alcohol and precipitation with ether, which would add materially to the cost without any corresponding advantage in the product. Its wonderful efficiency in covering the taste of sulphate of quinia especially, either in powder, pill, or solution, is enough of itself to call it into extensive use at once, and prove a boon both to physician and patient.

Ammoniacal glycyrrhizin is sixteen times stronger than good root, and is said to be one hundred times stronger than sugar in its sweetening properties for masking the taste of medicines. A sample of 1 grain sulphate of quinia with 1 grain ammoniacal glycyrrhizin compared with a mixture of 1 grain sulphate of quinia and 100 grains sugar seemed to prove this assertion correct.

On the table we present a specimen of the ammoniacal glycyrrhizin in scales.

PHILADELPHIA, September 6th, 1876.

SANTONIN.*

BY OTTMAR EBERBACH.

QUERY 50.—Santonin has been seen in the market in thick prisms, very different in appearance from the usual flat crystals; is this due to crystallization from a different liquid from that ordinarily used?

IN answer to this query, continued to me at the last meeting, I can give but the results of my experiments, which, although they do not solve the problem, may be of use in further investigations. In May last I succeeded in procuring a sample having the above-mentioned characteristics from Powers & Weightman. Of this

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* Read at the Sixth Session.

lot I have a sample with me, also a sample of Charles T. White & Co.'s, bearing the usual appearance of flat crystals, and specimens showing the results of my experiments.

The sample received from Powers & Weightman was found, on examination, to be pure, and was used for the following experiments:

A. A hot saturated solution of santonin in 95 per cent. alcohol was made and set aside to crystallize, resulting in the usual flat form of crystals, as shown in Sample A.

B. The clear liquid decanted from A was left to spontaneous evaporation; the result was a lot of crystals more granular and less opaque in appearance than A, marked Sample B.

C. A hot saturated solution of santonin in dilute alcohol was placed on the water-bath until the largest portion of alcohol had slowly distilled off; the result was a lot of crystals in form of large scales of a pearly lustre. Sample C.

D. A hot saturated solution in benzol was set aside for spontaneous evaporation; left the santonin in tufts of beautiful needles. Sample D.

E. A hot saturated solution in water was placed on the water-bath, and slowly evaporated to one-third its volume, and set aside to cool; the crystals obtained were a mixture of the rhombic plates with a small lot of crystals of the prismatic form. Sample E.

F. A solution of santonin in caustic potassa was treated with acetic acid in slight excess and set aside to crystallize; the santonin was obtained in clusters of prismatic needles radiating from a common centre.

G. A cold saturated solution of santonin in rectified fusel oil was set aside for spontaneous evaporation; the scales obtained were thick, well-developed rhombic plates.

H. A hot saturated solution in fusel oil was evaporated slowly on a water-bath to one-fourth its volume; the crystals obtained were bundles of large prismatic crystals, different from those found in the market.

In summing up these results, the writer came to the conclusion that the form of crystals in question is due more to the quantities operated on, and conditions under which the crystallization takes place, than on the material used as a solvent, the crystals obtained from fusel oil bearing some resemblance to the form in question.

WHAT IS LACTO-PEPTIN?*

BY E. SCHEFFER.

QUERY 32.—What is lacto-peptin?

THE manufacturers of this preparation, Messrs. Reed & Carrick, of New York, are kind enough to answer this question by giving on their circulars, and on the labels attached to the bottles, the exact quantity of all the ingredients they mix together.

But a little misunderstanding and skepticism, no doubt, induced the Committee on Queries to put the above question at their last meeting in Boston, and in this way it came that I undertook the task of answering it. Lacto-peptin is said to contain pepsin, pancreatin, ptyalin, and sugar of milk, besides hydrochloric and lactic acids. The manufacturers admit that for the animal ptyalin they substitute the vegetable diastase.

For the three protein substances we have no simple tests by which their presence can be ascertained; the only tests by which we can with certainty prove their presence is by their physiological action, viz.: Pepsin by its digestive power on albuminoids, diastase by its action on starch, and pancreatin by the acidification of neutral fats and the saccharification of starch.

The presence of pepsin in lacto-peptin is easily and plainly proven, as the other component parts do not interfere with the digestive action of pepsin. A watery solution of lacto-peptin, made a little more acid by the addition of a few drops of hydrochloric acid, will dissolve coagulated albumen; but neither pancreatin nor diastase can be directly tested for on account of the presence of acid and of sugar. For this reason the examination of lacto-peptin proved to be of a complicated character, but I shall endeavor to give the result in as condensed a form as possible.

One ounce of lacto-peptin was macerated in 12 fluid ounces of water for twenty-four hours, and the solution filtered off from the undissolved portion; the filtered solution, which showed acid reaction, was neutralized with an excess of freshly precipitated carbonate of calcium, then filtered again, and 3 volumes of alcohol, 0.815, added to it. A whitish mixture was obtained, which after some time began to separate into a flocculent white precipitate and a clear liquid, from which on standing crystals of milk-sugar were deposited.

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* Read at the Fifth Session.

The flocculent white precipitate, collected on a filter, was washed with alcohol 0.835, to remove all traces of sugar from it, and dried in the air. This precipitate should contain the pancreatin and diastase, if present, as both these substances are precipitated by alcohol from their neutral solutions.

The air-dried precipitate did not completely dissolve in water; the solution was neutral; by heat it did not coagulate, not even become turbid. Starch added to the solution was not acted upon, and Trommer's test did not indicate the presence of sugar.

To another portion of the watery solution, made slightly alkaline with caustic potash, a small quantity of fresh lard was added; the test-tube containing it was inserted into a water-bath of 110° F., for five minutes, but no acidification was noticed. The same experiment was repeated with the precipitate itself, instead of the watery solution, but likewise no acidification took place.

These three negative reactions prove the absence of pancreatin* as well as diastase. Pancreatin and diastase are both coagulated by heat, but the watery solution of the flocculent precipitate was not coagulated by heat, did not even become turbid. As no acidification of lard took place pancreatin is excluded, and by the failure of obtaining sugar from starch, neither pancreatin nor diastase can have been present.

That portion of the alcoholic precipitate which did not dissolve in water, dissolved easily on addition of a small quantity of hydrochloric acid; it consisted principally of pepton with a little pepsin. The pepton showed itself by the purple color which the acidulated liquid assumed on the addition of sulphate of copper and caustic potash. The presence of pepsin was proven by adding to the solution a little more acid and coagulated albumen, which was clearly acted on and dissolved.

The excess of carbonate of calcium, which was used to neutralize the filtered lacto-peptin solution, had become quite voluminous, indicating that a substance was precipitated with the lime from the neutral solution. This precipitate was thoroughly washed, and

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* A nice and easily executed test for pancreatin is the following: Put a small quantity of pancreatin into a test-tube, add a few drops of water, and then dilute caustic potash solution, until the liquid shows a slight but decidedly alkaline reaction, then add a small piece of fresh lard, cork the test-tube and insert it into a water-bath of 110° F., and shake occasionally; after a few minutes acid reaction will show itself, which will increase on standing. If the pancreatin solution is dilute, it takes a longer time, but the reaction will occur.

then carefully dissolved by the aid of dilute hydrochloric acid; the clear solution produced on addition of a saturated solution of sodium chloride the characteristic globular precipitate of pepsin, which after being pressed, dried, and dissolved in acidulated water, digested coagulated albumen, showing that pepsin in the neutral state had precipitated with the carbonate of calcium.

The sediment obtained from the original lacto-peptin solution contained mucus to which pepsin was adhering, fat, starch, and cellular tissue. The mucus was proven by preparing pure mucin from it; the pepsin in the ordinary way by its power to dissolve albumen in acidulated solution; the fat by extraction with ether; the starch by boiling a little of the sediment with water and adding iodine, and the cellular tissue and starch by the microscope.

To prove the presence of lactic acid one ounce of lacto-peptin was macerated with strong ether for twenty-four hours, then transferred to a filter and washed several times with ether. The resulting ethereal extraction of acid reaction was allowed to evaporate spontaneously, and resulted in a considerable quantity of a crystalline yellow residue; water added to it assumed strong acid reaction, but dissolved only a small portion. The watery solution, in which the presence of hydrochloric acid could be clearly proven, was evaporated on the water-bath until all the acid vapors of hydrochloric acid were removed, and yielded then a thick syrup of yellow color and strong acid reaction, which added to a saturated solution of acetate of zinc, formed crystals of lactate of zinc, proving the presence of lactic acid.

That part of the ethereal extraction which did not dissolve in water was collected on a moistened filter, and repeatedly washed with water until the washings no longer showed acid reaction. In cold strong alcohol it dissolved for the greater part, giving to the solution a strong acid reaction, while that part which was not dissolved by the alcohol was entirely neutral,—neutral fat. The alcoholic solution yielded on evaporation on the water-bath a fatty acid of yellow color, which by a temperature of 90° separated into a liquid oil and a crystalline body; no doubt oleic and margaric acids.

The lacto-peptin which was extracted with ether to determine the presence of lactic acid, and by which operation the fats were also obtained, was afterwards extracted with water; the insoluble part was thoroughly washed, and then treated with caustic potash solution, to dissolve the mucus and albuminoids. Besides starch another substance was left undissolved, which was examined under the microscope, and showed cellular tissue of vegetable origin, which on being compared with the husk of barley malt, showed exactly the same anatomical structure.*

The examination of lacto-peptin resulted so far in the presence of sugar, lactic acid, hydrochloric acid, and pepsin, ingredients which the manufacturers claim to be in their preparation and in the absence of pancreatin and diastase, while instead of these two protein substances there was found starch, cellular tissue, and fat; substances whose presence in the lacto-peptin appear to me very significant.

When we look over the circulars accompanying the advertisement of lacto-peptin in different medical journals, and read about the wonderful active power of this preparation, every clear-minded and unbiassed reader must necessarily become a little skeptic, and particularly so when he undertakes the trouble to make some of the tests which the manufacturers propose.

Thus, for instance, the manufacturers claim in regard to the digestive power that it will dissolve from three to four times more coagulated albumen than any other pepsin in the market. Compared with saccharated pepsin of four different makers, the lacto-peptin was found in every case inferior, by not dissolving as much coagulated albumen and acting each time much slower. Their assertion in regard to the following test, "to 5 fluid ounces of water add 1 drachm of lacto-peptin, ½ a drachm of hydrochloric acid, and 10 ounces of coagulated albumen," is simply ridiculous.

For the emulsive power of lacto-peptin the manufacturers propose and certify to the following test: "1 drachm of lacto-peptin dissolved in 4 fluid drachms of water will emulsionize 16 ounces of cod-liver oil." I wonder if any one, following this direction, has succeeded in obtaining an emulsion?

But the most remarkable is the announcement, that "1 drachm of lacto-peptin will transform 4 ounces of starch into sugar." In order to ascertain the value of this statement the following experiment was made: A thick starch-paste was prepared from 2 ounces of starch and 20 ounces of water; while still hot and semi-liquid it was equally divided into two wide-mouthed bottles. After the paste had cooled to 115° F., to the one bottle was added 1 drachm of

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* In the microscopical examinations I was kindly assisted by Dr. L. D. Kastenbine, Professor of Chemistry of the Louisville College of Pharmacy.

lacto-peptin, mixed with ½ an ounce of water; to the other bottle ¼th of a grain of freshly prepared diastase, dissolved in 2 drachms of water. By the time the paste had cooled down to the temperature of the air (80° F.), the paste containing the fourth of one grain of diastase had become quite thin, and after a couple of hours watery; while the paste containing the lacto-peptin had become solid, so that the bottle could be upturned without anything flowing out, and this condition it retained for two days.

The comparatively large quantity of starch found in one ounce of lacto-peptin, in connection with the vegetable tissue revealed by the microscope, appeared to me so very suspicious that I considered it worth while to examine the diastase which the same firm prepares, and which I obtained from the manufacturers. It is a white powder, and consists, as they assert, of 1 part of diastase and 4 parts of milk sugar. The following experiments were made:

1. 10 grains of this powder were added to a thick starch-paste (1 ounce of starch to 10 ounces of water), after it had cooled down to 115° F. By the time the mixture had reached the temperature of the air the paste had gelatinized, but after four hours it became semi-liquid, and the following day it had the consistence of thick cream. Another quantity of thick starch-paste, prepared in the same way, to which was added one-fourth of one grain of diastase, prepared by myself, was by the time it had cooled to 80° F. thin, and after four hours a watery liquid.

2. 100 grains of the white powder were extracted with a mixture of 2 parts of strong alcohol and 1 part of water, until all the sugar was washed out, and left 19 grains of a grayish-white residue. By treating this residue with water a liquid was obtained, to which starch-paste was added and set aside for twenty-four hours. The liquid filtered off from the undissolved starch gave with Trommer's test traces of sugar.

3. 60 grains of the white powder left after extraction with water a little over 9 grains of a grayish-white residue, of which a small portion, boiled with water, gave by addition of iodine a deep blue-black coloration. Examined under the microscrope, starch-granules, gluten-globules, and vegetable cellular tissue were plainly recognized in the grayish-white residue.

The facts elicited by the above experiments indicate beyond doubt that this so-called diastase is nothing but a mixture of sugar with barley malt; that it is powdered malt is proven in No. 1 and 2 by the slight action on starch. The insoluble portion which was ascertained in No. 3 and weighed in the air-dry state a little over 9 grains, corresponds pretty exactly with the insoluble parts of malt, as found by Mr. W. G. Valentin in his analysis of malt. See Am. J. of Pharmacy, July, 1876.

Alike suspicious appears the presence of fat, and particularly of fatty acid in the lacto-peptin, from 1 ounce of which over 10 grains were obtained by extraction with ether. How shall we account for it?

By examining the pancreatin of the same firm which, they say, contains in 1 ounce 1 drachm of *pure pancreatin*, I found by extraction with ether a large quantity of fat, mostly in the acid state, while the residue after extraction with water, and examined under the microscope, proved to be principally animal tissue.

The answer to Query 32 is simply this, that lacto-peptin is an acidulated saccharated pepsin, contaminated with a number of inert substances, and that in its digestive strength it is inferior to the saccharated pepsins of the market.

NOTES ON PANCREATIN, DIASTASE, AND PTYALIN.*

BY E. SCHEFFER.

It seems to be a prevalent idea of some of our physicians nowadays, that all the secretions of the different glands in the animal system, in combination with each other, would and could produce wonderful therapeutical effects. Because they wish it to be the case they take it for granted that it is so, without taking into consideration the difference in the functions of these secretions, or their chemical difference. They communicate their idea to a manufacturer or druggist, who feels proud to be honored by the task to prepare such a combination, but who never troubles himself afterwards to test whether these easily changeable ferments are in their normal state in his preparation.

At our last meeting in Boston I read a paper on pancreatin, in which by experiments was proven that pepsin and pancreatin are incompatible together, and that pancreatin in acidulated pepsin solution is destroyed. I have repeated this last winter my experiments, and found them confirmed.

My object is now to draw attention to experiments that were made in regard to pepsin, diastase, and ptyalin.

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* Read at the Fifth Session.

Diastase is contained in malt in the neutral state; pancreatin and ptyalin are secreted from their respective glands in the neutral or alkaline state. We have, therefore, to presuppose that it is only in such a state that they can and do exercise their physiological functions. In their combination with pepsin they will be dispensed either in acidulated solution or, when administered in the dry neutral state, they will be in acidulated solution after coming into the stomach.

Of pepsin, we know that it loses its action on albumen in alkaline solution; and likewise it is but natural to suppose that ferments, which act in the alkaline state in the animal household, will become inactive in acid solution.

In regard to diastase, Bouchardat says (see Gmelin's "Organic Chemistry," under Starch) that hydrochloric acid impedes the action of diastase on starch and destroys the diastase. To ascertain this fact I prepared diastase, from which a solution was made (4 grains to the fluid ounce of water), which is marked No. 1; to one ounce of this neutral solution, 1 drop of hydrochloric acid was added (No. 2), and to another ounce 3 drops of the same acid (No. 3); the liquids were set aside for twenty-four hours. After this time 2 drachms of each of these solutions were diluted with 6 drachms of water, and 1 drachm of solid starch-paste added to each vial.* The following day an equal portion of each vial was filtered off into test-tubes, and the same amount of sulphate of copper solution and caustic potash added to each. In No. 1 all the copper was redissolved, and resulted in a deep blue solution, from which, after a few hours, the copper precipitated as suboxide; in Nos. 2 and 3 the copper was precipitated as hydrated oxide, which was not redissolved, and the liquids standing above the blue precipitate were colorless, a plain proof that in Nos. 2 and 3 the diastase was destroyed by the action of hydrochloric acid, and therefore no sugar was formed from the starch.

To another neutral diastase solution pepsin was added, dissolved in a little water, and just enough hydrochloric acid to bring it into solution; this liquid gave, after several hours with Trommer's test, a purple coloration, proving that pepton had formed by the action of pepsin on diastase.

To one ounce of acidulated pepsin solution 4 grains of diastase

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* By solid starch-paste I mean a very thick paste, made from 1 part of starch and 4 parts of water, which after cooling is easily broken into separate lumps.

were added, and after solution 20 grains of dry blood fibrin and 1 drachm of solid starch paste. After the fibrin had dissolved the liquid was filtered off from the starch, neutralized with carbonate of sodium, evaporated to dryness, and then the residue extracted with alcohol 0.835. The alcoholic solution was evaporated to dryness, the remnant dissolved in water, and Trommer's test added to it; a deep purple clear liquid was obtained, from which no suboxide of copper was precipitated, proving that no sugar has been formed.

These experiments teach us that diastase is destroyed by action of hydrochloric acid; that pepsin converts it into pepton, and that therefore diastase in acid pepsin solution cannot produce sugar from starch.

The experiments with ptyalin were made with fresh saliva, which I obtained in sufficient quantity for experiments in a very short time by the following method:

After having rinsed the mouth well with water, I applied with a camel's-hair brush tincture of pyrethrum to the gum below the hindmost molars of both sides, opened the mouth and pressed the lower jaw down as far as possible, whereafter the saliva commenced flowing freely. At first the saccharifying action on starch was ascertained by adding solid starch-paste to a portion of the normal saliva, and also to another portion, mixed with three parts of water. After two hours, by which time the lumps of starch had entirely disappeared in both vials, a part of each liquid was filtered off; these gave by addition of Trommer's test heavy precipitates of suboxide of copper, showing that abundance of sugar had been formed.

Other portions of saliva were mixed with a pepsin solution (prepared from half a grain pure pepsin, one ounce of water, and four drops of hydrochloric acid), in the proportion of one-half, one, and three of pepsin solution, to one of saliva; about the same quantity of solid starch-paste was now added to each of the mixtures. After three hours a portion was filtered off from each vial and tested for sugar, but not a trace could be noticed. The copper was precipitated as hydrated oxide and not redissolved, while the liquids standing above the precipitates showed a slight purplish tint, indicating that pepton had been formed. The tests were repeated after the mixtures had stood twenty-four hours, with the same result.

I believe these tests are sufficient to prove that the ptyalin in the saliva had lost its saccharifying properties in acidulated pepsin solution, and no doubt was decomposed itself; and from these results we may infer that the same action takes place when the saliva comes into the stomach, or when ptyalin is administered as such.

The foregoing experiments were made with a view to substantiate the action of pepsin, upon which all physiological authorities agree, namely, that it acts in a like manner on all albuminoids and converts them into pepton.

THE ADULTERATION OF MILK AND THE METHOD OF DETECTING IT BY ANALYSIS.*

BY S. P. SHARPLES, S.B.

I FEEL some diffidence in bringing before the Association a subject that seems so purely to belong to analytical chemistry as this. But every educated pharmacist is more or less of a chemist, and is frequently called upon to solve just this question. If he attempts to look up the subject in the books he soon becomes bewildered; for with the single exception of Mr. Wanklin no writer on the subject has ever laid down plain and easily followed methods for the analysis of this important fluid, but each author seems to have pinned his faith upon some one particular determination to prove the purity of the sample in question.

Three or four years ago I was led to investigate the methods of analysis of milk from the fact that I was sometimes called upon to give my opinion of a sample of milk in court. As the result of my investigations I was led to adopt the following method, which is in no one part original with myself, although so far as I know the full analysis as I give it has never been recommended by any one author. The determinations made are those which by comparison of many authors have seemed to me to be the most likely to lead to correct results in the shortest space of time.

As to the time taken in the analysis, six samples of milk can easily be analyzed in a day with the use of only three evaporating dishes; six tubes for the cream will, of course, have to be used. But the determination of the cream is the most unsatisfactory of

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* Read at the Sixth Session.

all the determinations made, and no dependence can be placed upon it, a watered milk frequently showing more cream than the same milk not watered. If the analyst wishes to make use of his work in court, it will be necessary that he should in all cases be prepared to state that he has analyzed six or eight samples of pure milk; for the judges seem, as a general rule, to be possessed with the idea that unless a man has analyzed samples of milk known to be pure he can form no opinion in regard to adulterated milk.

The following is the course that I have found it best to pursue; it is identical, with the exception of the sugar determination, with that followed by Professor Merrick in his determinations made for the city of Boston.

In the first place, the specific gravity is carefully determined, either by weighing in a flask graduated to hold 100 grams of water at 60° F., or by employing a carefully tested hydrometer. Then about 5 grams of the milk are carefully weighed in a platinum dish, and the weight noted. The form of dish I have found best for this purpose is one about two and a quarter inches in diameter by about half an inch deep; such a dish should not cost much over five dollars, and will be found to be an extremely convenient piece of apparatus. The bottom should be almost perfectly flat, in order that the milk when dried shall form as thin a layer as possible. The dish is placed upon a water-bath heated to 212° F., and allowed to remain there about an hour and a half; at the end of this time it will be found that the milk has become dry, and has separated into two layers,—a thin film which is wrinkled and broken, and a somewhat thicker film which presents a honeycomb appearance, and adheres firmly to the bottom of the dish. In order to insure the complete drying of this residue, it is placed in an air-bath heated to about 220° F. for half an hour. At the end of this time its weight is found to be sensibly constant; this weight is noted. The weight of the dish subtracted from the weight just found gives the weight of the total solids in the milk.

The weight of the total solids divided by the weight of the milk taken, and multiplied by 100 gives the percentage of total solids. The dish is then filled with benzin, allowed to stand, best under a bell-glass, for half an hour, the benzin poured off, care being taken that none of the upper film is disturbed, and a fresh portion of benzin poured on this is allowed to stand again for half an hour, and poured off as before. The dish is then washed out with a little fresh benzin, and placed in the air-bath, where it stays about half an hour. The weight has now become constant, and it is again weighed. This weight, deducting the weight of the dish, gives the weight of the solids not fat. The percentage is found as before. The dish is now ignited at a low red heat until all the carbon is burned off, and weighed; this weight gives the weight of the ash.

These determinations are all that are really necessary to determine the question of the purity of the milk. The sugar is, however, generally determined in my analysis more as a check upon the other determinations than as an item on which to determine the purity of the milk. In order to determine the amount of sugar 25 cubic centimetres of the milk are diluted with about twice their volume of water, a few drops of acetic acid added, and the mixture gently warmed, care being taken to avoid too great a degree of heat. It is allowed to cool and filtered, and the filtrate made up with water to 500 c.c., and tested with a standard solution of copper tartrate, made by dissolving 3.465 grams of copper sulphate in 20 cubic centimetres of water, and adding this to a solution of sodio-potassic tartrate, made by dissolving 17.5 grams of sodio-potassic tartrate in 48 cubic centimetres of sodic hydrate of a specific gravity of 1.14. The solution is then made up with water to 200 c.c., and 20 c.c. of this taken for each test. The test is made by bringing the copper solution diluted with about 30 c.c. of water to a boil, and adding the whey until a few drops of the solution, when filtered and acidulated with acetic acid, cease to give the well-known brown coloration with potassic ferrocyanide. The 20 cubic centimetres of copper solution employed are equal to .067 gram of milk sugar.

In order to find out how much sugar the 25 cubic centimetres of milk taken contained, we have the following formula:

$$\frac{500 \times .067}{\text{c.c. of whey used.}}$$

This gives the weight of sugar contained in twenty-five centimetres; to find out the weight contained in 100 cubic centimetres this is multiplied by four. This weight divided by the sp. gr. of the milk gives the per cent. of sugar in the milk.

In order to save the trouble of going through with this calculation every time, I have constructed a table giving the weight of sugar corresponding to each 100 cubic centimetres of the whey used. The numbers in this table divided by the sp. gr. of the milk give directly the per cent. of sugar in the milk.

Weight of Sugar in 100 *Cubic Centimetres.*

C.C. of whey used.	0.	1.	2.	3.	4.	5.	6.	7.	8.	9.
10	13.40	12.17	11.17	10.30	9.57	8.92	8.38	7.91	7.44	7.05
20	6.70	6.39	6.09	5.83	5.58	5.36	5.15	4.96	4.78	4.62
30	4.46	4.32	4.19	4.06	3.94	3.83	3.72	3.62	3.53	3.44
40	3.35	3.27	3.19	3.11	3.04	2.98	2.91	2.85	2.79	2.74
50	2.68	2.63	2.58	2.53	2.48	2.44	2.39	2.35	2.31	2.27
60	2.23	2.19	2.16	2.13	2.09	2.06	2.03	2.00	1.97	1.94
70	1.91	1.88	1.86	1.84	1.81	1.79	1.76	1.74	1.72	1.69
80	1.67	1.65	1.63	1.61	1.59	1.57	1.56	1.54	1.52	1.51
90	1.49	1.47	1.46	1.44	1.43	1.41	1.39	1.38	1.37	1.35
100	1.34	1.32	1.31	1.30	1.29	1.2	1.26	1.25	1.24	1.23

Suppose, for instance, a milk of 1.03 sp. gr. yields a whey of which it takes 30 cubic centimetres to reduce 20 cubic centimetres of copper solution, then $\frac{4.46}{1.03} = 4.33$ per cent. of sugar in the milk.

100 cubic centimetres of the milk are set for cream in a tube graduated into cubic centimetres; the volume is read off at the end of twenty-four hours.

The per cent. of solids not fat taken from the per cent. of total solids gives the per cent. of fat. The per cent. of sugar and ash added together and taken from the per cent. of solids not fat gives the per cent. of casein and albumen.

In order to test the accuracy of this method of analysis, I have made a number of duplicate analyses of the same milk.

The following was made on the 28th of August, 1876. The milk was drawn on the evening of the 25th, kept on ice over night, and brought to me next morning about 10 o'clock. The cow was full-blood Alderney. In making the analysis I did not consider the first analysis satisfactory for some reason, so after it was finished I took a second sample, using the same dish as I had in the first instance, with the result that confirmed my first analysis. The whole work was finished by 6 o'clock, a duplicate analysis of another sample being carried on simultaneously.

Cream per cent. by volume, ...	18.
Specific gravity, ...	1.030

	No. 1.	No. 2.	Average.
Sugar,	4.19	4.19	4.19
Casein and Albumen,	5 17	5.23	5.20
Ash,	.72	.72	.72
Solids not fat,	10.08	10.14	10.11
Fat,	4 35	4.35	4.35
	14.43	14.49	14.46

A second sample of milk supposed to be adulterated gave the following results:

Cream volume per cent.,	6.
Specific gravity,	1 021

	No. 1.	No. 2.	Average.
Sugar,	3.45	3.45	3.45
Casein,	2.78	2.79	2.785
Ash,	.48	.47	.475
Solids not fat,	6.71	6.71	6.71
Fat,	2.31	2.31	2.31
	9.02	9.02	9.02

In this case the determinations were made in duplicate except the sugar.

In the interpretation of analyses, instead of taking the average amount of solids as found in over thirty samples of pure milk from the vicinity of Boston, as found by Professor Babcock and myself, which is about 14.5, I have taken the number 12.5 as the average amount of total solids found in pure milk, thus giving the milkmen a leeway of 2 per cent. of solids, which is equivalent to 13.8 per cent. of water added to the 14.5 per cent. of milk.

In order to find the amount of added water, supposing the sample to be composed of pure milk containing 12.5 per cent. of solids and added water, we have taken the sample last quoted:

12.5 : 9.02 : 100. 72.16

That is, the sample contains 72.16 parts of pure milk and 27.84 parts of added water.

Some prefer to take the solids not fat as the standard, and say that an average milk should contain 9.3 per cent. of solids not fat. This, again, is below the average of thirty-three samples of pure milk that I have examined; my average was 9.58. However, taking it as before and making the proportion, we have

9.30 : 6.71 100. 72.1

or the milk contains 72.1 parts of pure milk and 27.9 parts of added water, or almost exactly the same figures as before.

It will be noticed that, in determining the added water, I have not taken into the account the sugar, casein, specific gravity, ash, or cream. All these, in fact, enter into the account, in a greater or less extent, in making up my judgment as to whether the milk is watered, and I would not be willing to rely upon any single determination to say that the milk was watered.

The statement of the amount of added water is mainly an estimate to show the court how far below what is considered an average milk of fair quality the sample falls, and is by no means an absolute statement like the facts of the analyses.

To show the variation in milk I annex some tables made out about a year ago for a report to the American Academy on this subject, and I also add the analysis of a number of samples of adulterated milk, with the added water calculated from the amount of total solids and from the solids not fat. These samples were seized by the milk inspector of Lynn, Massachusetts, and convictions were secured in nearly every case.

Pure Milk.

Samples.	Number of specimens.	Solids.	Not fat.	Casein.	Ash.
J. F. Babcock, Boston, . .	8	14.55	.....	.....	.88
S. P. Sharples, " . .	22	14.49	9.61	4.13	.66
Vernois & Becquerel, France,	46	14.24	9.73	4.86	.65
Goppelstoder, Switzerland, .	60	14.13	.....	.....	....
H. W. Vaughan, Rhode Isl'd,	58	14.08	10.07	4.99	.75
Lebert, France, ...	...	14.00	9.75	5.50	.75
Letheby, England, ...	...	14.00	10.10	4.10	.80
Playfair, Scotland, ...	9	13.49	8.61	4.17	.55
Phipson, England, ...	...	13.33	8.46	3.76	....
Chevalier, France, ...	2	13.23	10.31	3.98	.78
Wanklin, England, . . .	3	13.12	9.36	4.56	.72
Cameron, Ireland, ...	40	13.00	9.00	4.10	....
Chevalier & Henry, France,	...	12.98	9.75	4.48	.60
A. Muller, Sweden, . . .	...	12.85	9.43	3.42	.72
Boussingault, France, . .	9	12.71	8.80	3.47	.25
Haiden, ...	...	12.70	9.70	4.82	.49
Chandler, New York, . . .	1700 qts.	12.55	8.72	3.88	.76
MacAdam, England, . . .	66	12.27	9.69	.....	.71
Voelcker, England, . . .	22	12.10	9.15	2.93	.83
Von Baumhauer, Holland, .	162	11.30	8.45	.....	.72

The limits of variation observed by some of the above analysts were

Samples.	Total solids.		Solids not fat.	
	Highest.	Lowest.	Highest.	Lowest.
Dr. Voelcker, ...	14.00	9.30	9.88	7.51
Dr. MacAdam, ...	15.54	10.57	11.23	8.74
Von Baumhauer, ...	13.23	10.18	8.93	8.08
Vernois & Becquerel, . .	19.68	11.70	10.56	7.73
Vaughan, ...	16.96	12.85	11.14	8.79
Sharples, ...	19.34	11.64	11.42	7.88

It has been urged that, since we meet with such variations in pure milk, it will be impossible to judge whether a milk is watered or not. To show that this does not necessarily follow, I have added to the table of adulterated milk two samples in which the total solids and the solids not fat were very low, and if we were to rely upon a single determination in either of these cases we might be led astray; but the whole analysis, as it stands, shows that the milk in each case was not adulterated, or, at least, they are both milks that no careful chemist would report as adulterated.

Adulterated Milk.

Specific Gravity.	Cream.	Sugar.	Casein.	Ash.	Solids not fat.	Fat.	Total solids.	Added water from Solids not fat.	Added water from Total solids.
1.023	7.	3.36	2.94	.45	6.75	2.46	9.21	27.42	26.32
1.020	6.	3.37	3.11	.45	6.93	2.26	9.19	25.49	26.47
1.021	7.	3.00	2.77	.40	6.17	2.00	8.17	33.66	34.64
1.020	5.	2.86	3.00	.42	6.28	2.16	8.44	32.47	32.48
1.021	6.	3.45	2.78	.48	6.71	2.31	9.02	27.85	27.84
1.022	4.	3.74	3.27	.56	7.57	2.33	9.90	18.60	20.80
1.023	5.	3.36	3.24	.50	7.10	2.25	9.35	24.73	25.20
1.023	8.5	3.04	3.64	.43	7.11	2.16	9.27	23.60	25.84
1.026	8.	3.73	3.40	.48	7.61	2.53	10.14	18.17	18.88
				Pure Milk.					
1.028	5.	4.82	3.54	.57	8.93	2.71	11.64	3.98	6.88
1.018	5.4	5.06	2.21	.61	7.88	11.46	19.34	15.27	None.

IV. LIST OF BOOKS AND PAMPHLETS ON PHARMACY AND THE COLLATERAL SCIENCES

PUBLISHED DURING THE PAST YEAR.

PREPARED BY C. LEWIS DIEHL, REPORTER ON THE PROGRESS OF PHARMACY.

Ahles, Dr. Unsere wichtigeren Giftgewächse mit ihren pflanzlichen Zergliederungen und erläuterndem Text zum Gebrauche für Schule und Haus. Third edition. Revised from M. Ch. F. Hochstetter's Giftgewächse Deutschlands und der Schweiz. Part 1. Samenpflanzen. Phanerogamae. Esslingen: J. F. Schreiber. 1875.

Annuaire de la Pharmacie française et etrangère: Résumé de Chimie, Pharmacie, Histoire naturelle, Matière médicale, Toxicologie, Hygiène, Therapeutique. Rédigé par le Dr. C. Méhu. Année 1875. Paris: Au Moniteur Scientifique-Quesneville. 1876.

Arendt, R. Grundriss der organischen Chemie. Leipzig: Voss. 1875.

Baird, Spencer F. Annual Record of Science and Industry for 1874. London: Trübner & Co. 1875.

Barstow, W. Sulphurets: What they are, how concentrated, how assayed, and how worked. San Francisco: A. Roman & Co. London: Trübner & Co. 1875.

Beetz, W. Leitfaden der Physik. Fifth edition. Berlin: Nauck. 1875.

Beiche, W. C. Der kleine Botaniker. Langensalza: 1875.

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MINUTES

OF THE

TWENTY-FOURTH ANNUAL MEETING.

First Session.—Tuesday, September 12th, 1876.

The Twenty-fourth Annual Meeting of the American Pharmaceutical Association convened in one of the lecture-rooms of the Philadelphia College of Pharmacy, 145 North Tenth Street, on the afternoon of the second Tuesday of September, and, a quorum being present at 3 o'clock, was called to order by President Markoe, John M. Maisch officiating as Secretary.

The President appointed the following Committee on Credentials: Messrs. William Neergaard, of New York; W. J. M. Gordon, of Cincinnati; and Joseph P. Remington, of Philadelphia. The credentials from the delegations of the various colleges of pharmacy and local pharmaceutical associations having been handed in, the committee retired to attend to its duties, when the President read his annual address.*

On motion of Mr. Vogelbach, a vote of thanks was tendered to the President for his interesting address, the Treasurer, Mr. Tufts, putting the question.

The Secretary read the following letters of invitation:

1. From the Academy of Natural Sciences, inviting the members and their ladies to visit the new building and the extensive museum of the Academy.

2. From the Union League, tendering the use of the club-house to the members of this Association.

3. From Mr. J. W. Tufts, of Boston, offering the use of his pavilion, near the main entrance of the Exposition grounds, for letter writing and other conveniences.

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* At the request of President Markoe, the address was left in his hands to be copied, but had not been received at the time of going to press.—Editor.

Mr. Vogelbach moved that these invitations be severally accepted with the thanks of the Association, and the motion was carried unanimously.

Mr. Bullock.—It has been customary with this Association to appoint a committee to examine the specimens which were exhibited at the meetings of the Association. This year we have no exhibition, not wishing to have any competition with the great Exhibition in Fairmount Park. I would move that a proper committee, and quite an extended one, be appointed to report upon chemicals, pharmaceutical preparations, and other objects of interest to pharmacy, as exhibited by the different nations. That committee can report to our meeting next year.

Mr. Menninger.—I would move, as an amendment, that the committee report to the Executive Committee of the Association, so that the report may be embraced in the Proceedings of the Association. If the report is delayed until next year the publication will be delayed about sixteen months from the present time, when much of the matter of interest will then become old.

Mr. Bullock accepted the amendment, and the motion was carried. It was suggested that the committee consist of nine members, and, no other number being mentioned, this was adopted.

The Chair, commencing to name the committee, announced Mr. Maisch as one of the members, but, he declining, the appointment was deferred for the present.

Mr. Kennedy.—On the part of the Executive Committee, I wish to ask the mover of the motion whether it is intended that the publication of the Proceedings shall be delayed until that report is made, or, if the report is not made in time, that the Proceedings shall appear without it. The way the motion stands now it evidently means the publication of the Proceedings must be delayed until the committee are ready to report.

Mr. Menninger.—It was my intention that the committee should go to Rome, and that Rome should not go to the committee; that the committee should report in time for publication. I presume the appropriate committees on the Exhibition will give an elaborate report, and the report of our committee would be the one to take the place of the usual report made by our Committee on Exhibition.

Mr. Bullock.—I had that before me in making the motion, that there was a possibility the committee could not finish all their labors in time for the Proceedings of the Association. If they can do it, very well; if not, I think the Executive Committee ought not to wait for their report.

Mr. De la Cour presented an invitation to the members and their ladies to visit the Masonic Temple, stating that Friday forenoon had been specially set aside to show them through the building. The invitation was accepted with thanks.

Mr. Vogelbach moved that the report of the Committee of Arrangements be now called up to be acted upon by the Association. The motion was agreed to, and the Local Secretary, Mr. A. W. Miller, chairman of that committee, read the following report:

REPORT OF COMMITTEE ON ARRANGEMENTS FOR ANNUAL MEETING.

The committee appointed by the President to make arrangements for the present meeting respectfully report that they, in conjunction with the Permanent Secretary, have attended to the duties assigned to them to the best of their ability. In the early part of the present year a committee was selected by the Philadelphia College of Pharmacy with the same object in view, and the energetic assistance of these gentlemen has been of the utmost value to us. The joint committee have held, at short intervals, seventeen meetings, which have been presided over by your Permanent Secretary.

The building of the Philadelphia College of Pharmacy was selected for the meeting of the Association, on account of its central location, its associations of pharmaceutical interest, and its convenient internal arrangements. Although we anticipated an unusually large gathering, we believed the college halls to be of sufficient size to accommodate all the members who would be present, at least after the first session. We decided on the same building for our headquarters, as we found it to be impossible to obtain accommodations for all the members at any one hotel; also, because the entire edifice has been placed unreservedly at the disposal of the Association without any limit as to time, together with the services of the gentlemanly actuary of the college.

Our sub-committee on entertainments have prepared a programme for the guidance of the present meeting. This document, which is submitted herewith, has the unanimous approval of every member of the joint committee, who have carefully considered its various arrangements. The most prominent feature is the proposal to hold our sessions on alternate days, reserving the intervening time for visits to the International Exposition. We are led to advocate this plan as the one most likely to secure a fair attendance of members at our business meetings. On the other hand, we know from personal experience that the Exposition can be much more thoroughly enjoyed when it is administered in divided doses than when it is persisted in *ad deliquium*. Even if blessed with great physical vigor you will find that you cannot continuously visit the Exposition with any pleasure or profit to yourselves, since when the body is fatigued sight-seeing becomes a laborious task instead of being a much-coveted pleasure.

In the event of the approval of our programme our joint committee have signified their readiness to officiate as guides for our visitors on the days devoted to the Exposition. It is proposed to take dinner on those days, as a great pharmaceutical family, at Lauber's Restaurant within the Centennial grounds. We can secure meals there at a moderate rate, provided that notice is given on the previous day as to the number required, so that Mr. Lauber will have an opportunity of properly stocking his larder.

The Entertainment Committee has also perfected an arrangement with Mr. Morse, a first-class restaurateur of our immediate vicinity, to furnish members with luncheon or dinner on the presentation of cards, which can be obtained from our actuary at special reduced rates. As many of our members reside at a considerable distance from the college, and as others of our visitors have only secured lodgings, we think they will all appreciate the convenience of this plan.

The joint committee also desire to direct the attention of the Association to the fact that our first President, Daniel B. Smith, is still with us, as well as Peter Williamson, Edward B. Garrigues, and Dillwyn Parrish, all of them being early members of our college, in the days when the art of pharmacy was in its infancy on this continent. The committee would suggest to the Association the propriety of inviting these venerable gentlemen to seats on the platform with our presiding officers during the continuance of the Centennial meeting.

Programme for the Twenty-fourth Annual Meeting of the American Pharmaceutical Association.

Tuesday, Sept. 12, 3 P.M.—First session.

Wednesday, Sept. 13.—Visit to the Exposition. 8 P.M., Reception at St. George's Hall, 13th and Arch Streets. Tickets required.

Thursday, Sept. 14.—Meeting of the Association.

Friday, Sept. 15.—Visit to the Exposition.

Saturday, Sept. 16.—Meeting of the Association. At 2 P.M., drive for the visiting ladies.

Monday, Sept. 18.—Meeting of the Association.

Tuesday, Sept. 19.—Excursion to the Switchback. Members who wish to participate are requested to report to the Actuary of the College on or before Friday. The total expense will be about $6.

Respectfully submitted,

ADOLPH W. MILLER, *Chairman*,
JOSEPH L. DE LA COUR,
ALBERT P. BROWN,
J. W. WORTHINGTON,
CHARLES A. HEINITSH.

Mr. Kennedy moved that the report of the committee be accepted, and the recommendations and suggestions contained therein be adopted.

MR. SAUNDERS.—Would it not be desirable that we should hold evening sessions on those days we visit the Exposition? I think most of us have muscular ability to do the Exposition and hold a meeting after that. We could then have a session of two hours' duration, and get through a good deal of business, and perhaps finish up in a week, as some of us have come under the impression that the business of the Association would be completed during the week; and it will be inconvenient on the part of those who have come with that impression to extend the time until Tuesday. By holding evening meetings the business could be got through by Saturday night, and that would meet the convenience of many.

THE SECRETARY.—There is nothing in the programme that would interfere with any such plan. The principal recommendation is that certain days be devoted to visiting the Exposition.

MR. MENNINGER.—We could obviate all difficulty by voting to adjourn to meet in the evening. It would be impossible for us to meet to-morrow evening on account of the reception, but there is nothing to prevent our meeting on the evenings of those days on which we visit the Exposition.

MR. VOGELBACH.—In regard to the proposed excursion to the Switchback it should be known that the fare is regulated by the number, and if the majority of the members should leave at the close of this week, and only a small number participate in this excursion, it would increase the cost.

MR. JUDGE.—It seems to me it is extremely desirable that the arrangement for this meeting should be such that the deliberations shall terminate with the present week. If there are members here who came with the understanding to remain here next week, they certainly can do so after the adjournment of this meeting, but it is bad policy to break into the habit of this Association of closing its proceedings the current week when it convenes. It is better that we keep as nearly as possible to the customary habits. I trust that most of the members of this Association have come here for the purposes of the Association, and that while they are interested in the International Exposition, that that alone has not brought them together upon this occasion. I believe that it is the business of men to attend to their business first and their pleasure afterwards. Arrange our business in such a manner that we can do it in a compact way, and have sufficient time left for visiting the Exposition, and permit those who have but little time to devote it to the purposes of scientific investigation, and allow them afterwards to stay or go as they desire. They are not children to be taken by the committee within their grasp and told, "To-day you work and to-morrow you play." Put them in a position that they can do their work as usual, and afterwards let us loaf as long as we want to.

THE SECRETARY.—There is nothing at all in this programme that would interfere with the work before us. The Association heretofore has usually closed its labors in six sessions. If you go out to the Exhibition on alternate days, you can have eight sessions easy enough in the course of this week. For many years the Association has never adjourned before Friday, and occasionally on Saturday. By agreeing to the propositions of the Committee on Arrangements there is a possibility of holding one meeting on Tuesday, and three meetings if you choose on Thursday, which will make four; a fifth meeting on Friday evening, and three meetings on Saturday, which would make eight. If the work of the Association has heretofore been done in six sessions, it seems to me it might be done in eight sessions, but the committee brought forward the possibility, if evening sessions were *not* agreed to, of holding the closing meetings the following week.

MR. JUDGE.—To put this matter in shape, I move that the report be referred back to the committee, with the directions to so arrange the meetings that the proceedings of this Association may be closed by Saturday evening.

THE SECRETARY.—I hope that motion will not be seconded, because the committee have not arranged, and did not intend to arrange, the meetings, but merely to bring forward propositions. The committee desire to be understood there is no dictation intended for the Association to come, adjourn, or go to dinner at certain hours, or anything of the sort. They leave it entirely to the judgment of the members of the Association. The main and only important proposition is that two days in this week might be set apart for visits to the Exposition, because, in their experience, the Exposition is, as the chairman very properly says, much more enjoyable if you are guided through, and if you can enjoy it in the presence of others; and, moreover, it relieves you of the tediousness of going there afterwards, possibly every succeeding day. The joint local committee and the Committee of Arrangements supposed that the adoption of the proposition would insure the greater convenience and the greater enjoyment of every individual member, and finally result in the greater enjoyment of the sessions of the Association.

MR. EBERLE.—Another matter is to be taken into account, and I hope will be considered when the vote is taken. I speak as one of the local committee who had a part in making these arrangements, and in offering these propositions to the Association. In the arrangement proposed, that two days should be set apart for visits to the Exposition, it was not intended, as Prof. Judge, of Cincinnati, asserted, to be a mere day of pleasurable recreation in the ordinary sense of the term. It was intended to be also a matter of business in which this Association is very largely interested. I allude to a very thorough and critical examination of the pharmaceutical, chemical, and botanical display in the Exhibition, which is a part of our business here to-day, and which will contribute very largely, no doubt, to the information we shall take home as having been gathered on the occasion of this visit to Philadelphia. So I think the members should remember this fact and vote accordingly.

MR. SHEPPARD.—From some experience in visiting the Exposition I would say, it would seem to be well for the members to defer voting for evening meetings until they have spent at least one day in visiting the Exposition, which will be on Wednesday, and on Thursday they can vote intelligently as to the question whether or not they can stand it.

MR. VOGELBACH.—Prof. Maisch stated very distinctly that this report was not intended as a dictation to the Association by the committee, but merely as a recommendation. Prof. Judge, in his remarks, made it appear as if the committee wanted to dictate, and he used a term which I strongly object to when he said that, "those members who wish to loaf can do so when the meetings are over."

MR. JUDGE.—I said, "Then, if we desire, we can loaf."

MR. VOGELBACH.—You said, "Then let us loaf as long as we want to." A great school for investigation, and an immense collection of scientific and other objects that can be brought together in this world, lies over on the other side of the Schuylkill. We are here for investigation, and every member of the Association should have an opportunity to investigate our own particular branch of science and every other branch in which he may be interested. This committee, after due deliberation, not a hasty one—there were seventeen meetings of this committee, and it was only at the seventeenth meeting that the programme was decided upon—decided to present this report to the Association, recommending one day of labor here for our own benefit and for the benefit of the science we are greatly interested in, and one day of recreation, which at the same time would bring to us knowledge. We have forborne our exhibition here in our meeting because we have a greater one in Fairmount Park. I think this Association will be wise to accept the action of this committee on that matter in adopting that report, with all its recommendations. We are not only here for ourselves, but I hope that every married member has his wife with him, and I know very well she wants to enjoy the trip here. This is a peculiar year, in which all side issues drop. We are now in the one hundredth anniversary of this country's independence, and I think that on an occasion of this kind we can drop the usual routine of business without interfering with it; that we can cultivate our minds and derive the same knowledge, and get all the benefits that we have heretofore got from all the meetings of our Association, by carrying out the full intent of that programme, and I cannot see why a single person should object to it. My friend at my left says, "Do not vote for an evening session until you have tried the Exhibition." I have tried it half a day and a day at a time, and found that half a day is enough. I say, on an occasion of this kind, let us drop the usual rules. We have new associations, many new delegates from other States that have never been with us before. We have a larger attendance than we ever had before, from the very fact that the meeting is in this Centennial city, and for the purpose of viewing this Centennial Exposition. Give each and every one an opportunity to see it, and do not make them bring their business in conflict with their pleasure and instruction. What matter is two days? Saturday is the usual day of adjournment, and on Monday we propose to wind the meeting up. It is true some of those who have been blessed more with worldly goods have been here a few days before, and have had an opportunity to see the Exhibition; they may be anxious to go home, but those who have just come want to see it and derive the full benefits of it.

MR. HANCOCK.—I do not wish to take up the time of the Association. I think we should bear in mind the fact that the committee have carefully considered this question, and perhaps there are no members who are more capable of understanding the importance of an arrangement than they. It is, doubtless, a fact that they have suggested to this Association the best arrangement that can be made. I trust the Association will adopt the report of the committee, and I hope at the same time that the suggestions of the other gentlemen, Prof. Judge and Mr. Saunders, will be heeded also. If we go to work in earnest we can get through, I am satisfied, with the deliberations of this meeting this week. Doubtless there are many here who would like to see the labors of the Association terminated with this week, and it will be inconvenient for many to attend any sessions in the coming week, but as the Exhibition is one of instruction as well as pleasure, and this committee have made arrangements to make it as thoroughly so as possible, it is well that we shall avail ourselves of the advantages of the arrangements that are provided, and go to the Exhibition by systematic visits under their instruction and guidance, and we will find that it will be possibly as profitable to us in an educational sense as meetings of the Association. This is pre-eminently an age in which we are taught more by object-instruction than by any other means. It is the most profitable means of appealing to the understanding, and there are many objects of interest there, in chemistry and pharmacy, that will be quite as instructive to us, as pharmacists, as the papers which are to be read at the sessions here.

In regard to Mr. Sheppard's remarks, I think that possibly he did not understand that if we go on alternate days it will not interfere with our evening sessions on the days we remain here. By holding evening sessions on the days we remain in the city we can get through with the work on Saturday evening at least. I trust the members here will endeavor to arrange matters so that we can have all the advantages of the arrangements as proposed by the local committee; at the same time we will attend to all the business of the Association that is to be done this week.

MR. JUDGE.—The gentleman who spoke before the last seemed to think I used an expression that was offensive to the committee. If so, I certainly retract it. I certainly meant nothing offensive to the committee or to the Association, and if I accidentally let anything slip that might be thus construed, it was not done with any such intention at all.

The motion of Mr. Kennedy to accept and adopt the report was carried, and a motion made by Mr. Judge that evening sessions be held on the days the Association meets for business. The motion was opposed by Mr. Menninger as unnecessary; but Mr. Judge desired to have evening sessions made the rule for the present meeting, and the motion prevailed by 89 affirmative against 57 negative votes.

MR. ROBERTS.—I would like to ask the question if it is not competent for this Association to adjourn to any time they choose, notwithstanding the resolution which is passed.

THE PRESIDENT.—The chair should rule it was.

MR. ROBERTS.—I think that would be the ruling of the chair, so the vote goes for nothing.

Mr. Remington, on behalf of the Committee on Credentials, read the following report:

The Committee on Credentials respectfully report that they have received the following credentials:

Philadelphia College of Pharmacy.—Charles Bullock, Thomas S. Wiegand, Peter Williamson, Samuel F. Troth, William J. Jenks.

College of Pharmacy of the City of New York.—Paul Balluff, David Hays, Frederick Hoffmann, William Neergaard, Ewen McIntyre.

Cincinnati College of Pharmacy.—John F. Judge, Joseph H. Feemster, Herman H. Koehnken, William J. M. Gordon, Jacob D. Wells.

Massachusetts College of Pharmacy.—Thomas L. Jenks, William S. Folger, George F. H. Markoe, Samuel M. Colcord, Daniel G. Wilkins.

Maryland College of Pharmacy.—Joseph Roberts, Ferdinand Hassenkamp, William S. Thompson, Louis Dohme, John F. Hancock.

Chicago College of Pharmacy.—Matthew W. Borland, Herod D. Garrison, C. Garrison Wheeler, Thomas Whitfield, Charles Krusemarck.

Louisville College of Pharmacy.—Edward C. Pfingst, Ferdinand J. Pfingst, William G. Schmidt, C. Lewis Diehl, Emil Scheffer.

Ontario College of Pharmacy.—George J. Waugh, L. Y. Yeomans, William Saunders, Henry J. Rose.

St. Louis College of Pharmacy.—William H. Crawford, Enno Sander, Theodore Kalb, A. Pfeiffer.

National College of Pharmacy at Washington, D. C.—W. G. Duckett, J. W. Drew, A. M. Read, W. F. Scala, H. E. Kalusowski.

Tennessee College of Pharmacy.—John C. Wharton.

Newark Pharmaceutical Association.—Charles B. Smith, William H. Stanford, Edward P. Nichols, Ransford W. Vandevoort, J. A. Sayre.

Camden, N. J., Pharmaceutical Association.—Samuel W. Cochran, Albert P. Brown, D. Benjamin, James A. Armstrong.

New Jersey Pharmaceutical Association.—Charles C. Wells, Robert J. Shaw, G. A. Mangold, J. H. Tapping, P. W. Levering.

Washington Pharmaceutical Association.—Charles S. Price, Washington C. Milburn, William T. Baldus, Benjamin Whitesides, Clarence R. Dufour.

Rhode Island Pharmaceutical Association.—W. E. Boutelle, W. F. Teston, William B. Blanding.

Maine Pharmaceutical Association.—John E. Cook, Samuel Anderson, Herschell Boynton, Charles K. Partridge, Seth J. Wakefield.

Pharmaceutical Association of the State of South Carolina.—B. F. Moise, Charles O. Michaelis, Gustavus J. Luhn.

Georgia Pharmaceutical Association.—John Ingalls.

Connecticut Pharmaceutical Association.—Samuel Noyes, Samuel R. McNary, A. F. Wood, W. W. Mosher, H. Woodward.

Michigan Pharmaceutical Association.—Ottmar Eberbach, S. S. Garrigues, James Vernor, H. G. Colman, S. M. Sackett.

Literary and Scientific Society of the German Apothecaries of the City of New York.—Paul Balluff, Gustavus Ramsperger, Bernard H. Reinold, Adolph Tscheppe, Gustavus Balser.

Alumni Association of the Philadelphia College of Pharmacy.—C. Henry Kolp, William K. Mattern, George W. Kennedy, H. B. Taylor, C. D. S. Früh.

Alumni Association of the College of Pharmacy of the City of New York.—George C. Close, Starr H. Ambler, Theobald Frobwein, Byron F. McIntyre, Lucien M. Royce.

New York Alumni Association of the Philadelphia College of Pharmacy.—Benjamin F. Fairchild, J. Jungmann, Henry S. Wellcome, F. C. von Weber, Thomas D. McIlhenie.

Alumni Society of the Maryland College of Pharmacy.—Alpheus P. Sharp, John F. Hancock, J. Faris Moore, J. C. Fahlen, Vincent R. Jackson, Jr.

Association of the Alumni of the Massachusetts College of Pharmacy.—James F. Babcock, S. S. Bradford, Thomas Doliber, James S. Talbot, Samuel A. D. Sheppard.

Alumni Association of the Chicago College of Pharmacy.—Thomas Whitfield, Charles Krusemarck.

Alumni Association of the Louisville College of Pharmacy.—John C. Loomis.

Alumni Association of the St. Louis College of Pharmacy.—Enno Sander, W. H. Crawford, Theo. Kalb, A. Pfeiffer.

Chicago Drug Clerks' Association.—Charles M. Ford, Oscar Zinn, Frederick M. Lewis, H. H. Whittlesey, Charles Krusemarck.

William Neergaard,
W. J. M. Gordon,
Joseph P. Remington,
Committee.

The following delegations being likewise present, but their official credentials not having arrived, or having been mislaid, it was resolved that they be entered upon the list of delegates as previously reported:

New Hampshire Pharmaceutical Association.—Charles A. Tufts, Charles S. Eastman, George P. Underhill, Henry B. Foster, Elias S. Russell.

Alumni Association Cincinnati College of Pharmacy.—James H. Feemster, Henry Wagner, Theo. Norwood, Louis Schwab, Charles P. Rendigs.

Richmond Pharmaceutical Association.—R. W. Powers, Henry Bodeker, Polk Miller, E. C. Taliaferro, B. C. Lewis.

Vermont Pharmaceutical Association.—Amasa O. Gates, Milton K. Paine, William J. Van Patten, Charles C. Bingham, Frederick A. Moore.

On motion of Mr. J. F. Moore, the calling of the roll was dispensed with.

The Executive Committee reported the names of the following candidates for membership, all having complied with the requirements of the by-laws:

Connecticut.

Robert H. Dimock, Waterbury.
Frank V. Perry, Danbury.
R. S. Woodruff, Waterbury.

Delaware.

Z. James Belt, Wilmington.

District of Columbia.

G. A. Knabe, Washington.
Adolph J. Schafhirt, Washington.

Georgia.

Walter Adolphus Taylor, Atlanta.

Illinois.

Louis C. Hogan, Chicago.
Adolf G. Vogeler, Chicago.

Indiana.

August Schreiber, Tell City.

Iowa.

C. P. Squires, Burlington.
Hermann Tiarks, Monticello.
C. R. Wigert, Burlington.

Kentucky.

George W. Blatterman, Maysville.

Louisiana.

Charles O. Langebecker, Gretna.

Maryland.

Vincent R. Jackson, Jr., Baltimore.

Massachusetts.

Harlan Fairbanks, Worcester.
Samuel Kinsman Gilman, Jr., Boston.

Missouri.

E. J. Williamson, St. Louis.

New Hampshire.

Frank A. Colby, Lancaster.
Benjamin Morrill, Littleton.
Bayard Taylor Perry, Manchester.
Stephen F. Shaw, Rochester.

New Jersey.

F. Bruguier, Newark.
H. Klussmann, Hoboken.
S. L. Rumsey, East Orange.
Israel P. Smith, Newark.
Richard Miller Sommers, Camden.

New York.

A. J. Broughton, Rome.
George R. Brown, Poughkeepsie.
Jacob U. Burdge, New York.
S. M. Burroughs, Medina.
Edw. Seymour Dawson, Jr., Syracuse.
Henry H. Hunt, Ballston Spa.
Thomas O. Morrison, New York.
Charles Albert Robbins, New York.
Charles Edward Torrey, Norwich.
Julius C. Ubert, Brooklyn.
George Zellhoefer, New York.

North Carolina.

Thomas C. Smith, Charlotte.

Ohio.

A. M. Armstrong, Akron.
Z. T. Baltzly, Massillon.
William A. Graham, Sandusky.
Lewis C. Hopp, Cleveland.
Francis Marion Murray, Bluffton.
C. D. Wangler, Cincinnati.

Pennsylvania.

James Bowker, Philadelphia.
Joseph John Brown, Philadelphia.
J. Kellar Burns, Minersville.
Hugh Campbell, Philadelphia.
S. P. Dame, Sharon.
Edward Gaillard, Philadelphia.
Edw. Everett Hazlett, Philadelphia.
S. S. Holland, Pittsburg.
Joseph J. Karch, Lebanon.
James Kern, Jr., Pittsburg.
Mahlon N. Kline, Philadelphia.
Benj. Morris Magill, Philadelphia.
W. Walker Moorhead, Philadelphia.
B. G. Morgan, Hyde Park.
Thomas M. Newbold, Philadelphia.
Jas. Lemon Patterson, Philadelphia.
Stephen H. Rhoads, Pittston.
Albert D. Wike, Marietta.

Rhode Island.

John W. Cone, Providence.
William K. Reynolds, Providence.

Texas.

William J. Morley, Austin.
T. C. Thompson, Galveston.

West Virginia.

H. R. Hartung, Wheeling.
Alexander T. Young, Wheeling.

Wisconsin.

J. F. Prentice, Kenosha.
Henry C. Schranck, Milwaukee.

Nova Scotia.

Francis Cook Simson, Halifax.

The President appointed Messrs. E. T. Dobbins, Philadelphia, and William Saunders, London, tellers, who reported the unanimous election of the candidates.

On motion of Mr. Sheppard, it was resolved that when the Association adjourns, it adjourns to meet again on Thursday morning, at 9 o'clock.

The following reports of committees and officers were read by title and laid upon the table for future action:

Report on the Progress of Pharmacy.
Report of the Executive Committee.
Report of the Permanent Secretary.
Report of the Committee on Revision of By-Laws.
Report of the Committee on Ebert Prize.
Report of the Committee on Maximum Doses.
Report of the Committee on Legislation.
Report of the Committee on Adulterations and Sophistications.
Report of the Committee on the Liebig Memorial.
Report of the Committee on Metrical Weights and Measures.
Report of the Committee on Photograph Albums.
Report of the Committee on Julius Fehr's Complaints.

Mr. Calder, chairman of the Committee on Letter from Tennessee College of Pharmacy, who intended to be present at this session, had not arrived up to this time, and sent in no report, but had signified his intention of being present at the meeting.

The appointment of the Nominating Committee was next proceeded with, the various delegations present making the following appointments:

Philadelphia College of Pharmacy,	William J. Jenks.
New York College of Pharmacy,	Paul Balluff.
Cincinnati College of Pharmacy,	J. D. Wells.
Massachusetts College of Pharmacy,	Samuel M. Colcord.
Maryland College of Pharmacy,	Joseph Roberts.
Chicago College of Pharmacy,	C. G. Wheeler.
Louisville College of Pharmacy,	Edward C. Pfingst.
St. Louis College of Pharmacy,	Enno Sander.
National College of Pharmacy,	W. G. Duckett.
Tennessee College of Pharmacy,	J. C. Wharton.
Newark Pharmaceutical Association,	Charles B. Smith.
Camden Pharmaceutical Association,	S. W. Cochran.
New Jersey Pharmaceutical Association,	R. J. Shaw.
Washington Pharmaceutical Association,	William T. Baldus.
Rhode Island Pharmaceutical Association,	William B. Blanding.
Maine Pharmaceutical Association,	John G. Cook.

Georgia Pharmaceutical Association,	John Ingalls.
Connecticut Pharmaceutical Association,	Samuel Noyes.
Michigan Pharmaceutical Association,	James Vernor.
Pharmaceutical Association of the State of South Carolina,	G. J. Luhn.
Literary and Scientific Society of German Apothecaries of New York,	Gustavus Balser.
Alumni Association of the Philadelphia College of Pharmacy,	George W. Kennedy.
Alumni Association of the New York College of Pharmacy,	L. M. Royce.
New York Alumni Association of the Philadelphia College of Pharmacy,	Henry S. Wellcome.
Alumni Society of the Maryland College of Pharmacy,	John F. Hancock.
Alumni Association of the Massachusetts College of Pharmacy,	James F. Babcock.
Alumni Association of the Chicago College of Pharmacy,	Thomas Whitfield.
Alumni Association of the Louisville College of Pharmacy,	John C. Loomis.
Alumni Association of the St. Louis College of Pharmacy,	W. H. Crawford.
Chicago Drug Clerks' Association,	Charles Krusemarck.
New Hampshire Pharmaceutical Association,	Charles A. Tufts.
Alumni Association of the Cincinnati College of Pharmacy,	James H. Feemster.
Richmond Pharmaceutical Association,	H. Bodeker.
Vermont Pharmaceutical Association,	W. J. Van Patten.

In addition to these, the President made the following appointments from the Association at large: Ottmar Eberbach, Ann Arbor, Mich.; Phil. C. Candidus, Mobile, Ala.; William McIntyre, Philadelphia; Charles H. Dalrymple, Morristown, N. J.; and George Leis, Lawrence, Kansas.

The chairman of the Executive Committee read his annual report as follows:

To the Officers and Members of the American Pharmaceutical Association:

In conformity with requirements of Chapter vi, Article iii, of the By-Laws, I would submit this as my report for your deliberation. The twenty-third volume of the Proceedings of your Association was issued in the early part of the month of January, being two or three weeks earlier than last year. It is the largest and, I believe, the most interesting volume issued by the Association. The contents, on perusal, will be found to compare favorably with any previous volume, containing in all 899 pages. 460 pages are taken up by the Report on the Progress of Pharmacy, 70 pages by reports of committees, 180 pages by original papers, and the balance is occupied by the minutes, constitution and by-laws, roll of members, etc., besides 69 woodcuts, which add to make the work indispensable to pharmacists.

I here desire to say that the spirit displayed by our able and efficient Permanent Secretary is highly praiseworthy; he labored indefatigably, day and night, with the anticipation of having the Proceedings in possession of the members by the commencement of the present year; his work was crowned with victory, but by procrastination on the part of one of the officers he was prevented from distributing them until the first or second week in January. The early publication of the Proceedings is also due to the promptness with which nearly all the papers and reports were handed in, either at the meeting or immediately after adjournment. It gives me much pleasure so to report, and I earnestly and sincerely hope that when next year rolls around we shall have the pleasure of listening to a similar report. There is no reason why reports and papers should not be ready to hand in at the meeting as well as several months subsequently, which was of frequent occurrence prior to last meeting. There is but one exception, and that is the report of the Committee on Exhibition of Specimens, their work being arduous and the time insufficient to prepare a report.

As was suggested by your chairman in my last report, the picture of our deceased friend and laborer, Prof. Edward Parrish, was published with the last Proceedings; the portrait was printed from a steel-plate engraving obtained from a son of the deceased, Mr. Clemmons Parrish, at a cost of $45 per thousand, including printing. One thousand three hundred were ordered, making the total expense of $58.50, that amount being about one-third the cost of the plate alone. The likeness is an excellent one, representing our deceased member at a time when many of his investigations were made.

Your committee have already taken steps to embellish the next volume of Proceedings with the portrait of the late John Milhau, of New York City.

In my last report I reported a membership of 983; there should have been a deduction made of 10 deceased members, leaving but 973.

Report of Membership.

Number of members in good standing at last report,		973
Number of new members elected at last meeting,	139	
Number of delegates who became members by signing the constitution,	15	
Total new membership at last meeting,	—	154
Increasing the strength of the Association to		1127
Loss in membership since last report:		
By resignation,	8	
Dropped from roll for various causes,	42	
By death,	11	
Total loss,	—	61
Leaving a balance of membership in good standing, at this report, of		1066

Besides the above membership we have twenty honorary members.

It is a very pleasant duty for me to perform to report such a large addition to our organization, and I can safely assert it is gratifying to you all to hear such a statement made, that in the year 1875, at the meeting held in Boston, our membership increased 154, the largest addition made in any one year since the organization of the American Pharmaceutical Association. Applications for membership should be sent to the Chairman of the Executive Committee at least one week preceding the meeting, so that they can be thoroughly investigated, otherwise we are in danger of electing discreditable members. Some of you, no doubt, recollect distinctly at our last meeting I had about 75 applications to examine in a short space of time; all the work connected with the examination was done in a hurry, and I took for granted that the vouchers of the applicants would recommend no person but those in accordance with the requirements of the by-laws. A person was recommended by one of our more prominent members, who made no pretensions of being a pharmacist,—a man who kept nothing more than a small country store, or something of the kind. After his election for the first time he read the constitution. A communication was subsequently received from him, stating that he desired to resign, that he was ineligible to membership in accordance with the constitution of the Association.

For this and for other obvious reasons I appeal to you all to forward all applications early to the Executive Committee.

The names of all applicants who have complied with the requirements of the constitution for membership thus far have been regularly filed, and will be reported for election at the proper time.

By the Association, at its last meeting, the Executive Committee were directed to prepare a metallic badge, which should hereafter be recognized as the permanent badge. In compliance with this instruction, we have had made the die and cutter at a cost of $25, and an impression of the same is here exhibited. The committee have selected this design from a large number of others presented, as being very appropriate. It consists of a leaf, with mortar and pestle and a condenser stamped thereon, representing materia medica, pharmacy, and chemistry. We have ordered two hundred badges finished at a cost of $25 per hundred, which is considerably less than the estimates of other parties. We would suggest to each member the propriety of providing himself with a badge, the price for a nickel-plated one having been fixed at 50 cents. Those wishing gold or other expensive metal badges can procure them upon notification to the Permanent Secretary, who will have the die in his safekeeping.

FIG. 50.

The Executive Committee have had under consideration, during the past year, the subject of furnishing the officers of the Association with a badge, so that they can be readily recognized as such; for example, the President to wear a badge marked President, the Treasurer's marked Treasurer, and so on. Hitherto considerable confusion, disturbance, and delay in searching for the officers have been experienced. By the wearing of such a badge as recommended this trouble can to a very great extent be obviated. The badges are inexpensive, and have been purchased at a small expense to the Association. We would ask for your approval in this matter, and would suggest that they be worn only during the meetings, and during the interval they be placed with the Permanent Secretary, and he to be the proper custodian.

Before closing my report, I have the solemn duty yet to perform of reporting, with brief obituary notices, the names of twelve deceased members, who have passed from the present scene of probation.

The following list is all that have come to the notice of your committee:

Samuel A. Smith,	Newburyport, Mass.
William Hegeman,	New York City.
James W. Hommann,	New York City.
Conrad J. Geiger,	Canton, Ohio.
Jonathan C. Mattern,	Pittsburgh, Pa.
Peter J. Hassard,	Philadelphia, Pa.
James W. Smith,	Norfolk, Va.
Henry Schmid,	New York.
Charles H. Warren,	Brandon, Vt.
H. A. Suding,	Baltimore, Md.
Edward A. Smith,	Baltimore, Md.
Francis S. Gaither,	Washington, D. C.

Samuel A. Smith died at Newburyport, Mass., March 12th, 1873, in his thirty-eighth year, of apoplexy. Mr. Smith was born at Newburyport, Mass., November, 1835, commenced his apprenticeship to the apothecary business with W. T. Phillips, in Newburyport, and remained in his employ three years, afterwards the balance of his apprenticeship with Weeks & Potter, of Boston. The deceased leaves one child, a daughter, his wife having preceded him a few weeks. Mr. Smith became a member of this Association in 1859, at Boston.

William Hegeman, a prominent pharmacist of the city of New York, died quite suddenly in that place on Sunday, October 3d, 1875. Although for several months he had been failing in health, he was able to be in attendance at his business up to the day of his decease. On the morning of Saturday he was at a reception of the Century Club, of which he was a member, and as he was about to leave for home he was suddenly stricken with paralysis, and in a few hours after the attack proved to be fatal. Mr. Hegeman was a son of Judge Adrian Hegeman of the city of New York, and was born in the immediate vicinity of the Everett House in 1817, where for many years he conducted one of his popular drug stores, and where he died. His brother, Frederick A., and himself, early took positions where they could learn the drug business, and both subsequently engaged in it for life. The subject of this sketch, at the early age of eighteen, was given an interest in the business of his employers, they having noticed the great value of his attention to their business, and his excellent capacity as a manager. In 1837 he graduated from the New York College of Pharmacy. Mr. Hegeman was pre-eminently a thorough man in everything he undertook. Seldom is there to be found a person who so well combined the ablest faculties for business in all its details, and at the same time is so thoroughly versed in all that relates to scientific progress. His faculty for management and business was well illustrated by the fact that for so many years he conducted four or five different pharmaceutical establishments, and was cognizant of all the details of each. With all this business care and management he found time to make himself conversant with every scientific improvement of importance, and in his own profession was esteemed one of the best informed men of New York. He is spoken of as being of a warm, generous, and sympathetic disposition. He won the esteem and love of those with whom he associated. For several years he was President of the New York College of Pharmacy; he had previously served as Vice-President, and was one of the Board of Trustees at the time of his death. Mr. Hegeman became a member of this Association at Washington, D. C., in 1858.

James W. Hommann died Monday, October 25th, 1875, aged twenty-two years and nearly five months. Mr. Hommann was born in Green Bay, Wisconsin, June 3d, 1853. His family moved to Pennsylvania after James's birth, and his parents died while he was yet quite young, leaving him and his brother to take care of and educate themselves. Mr. Hommann is spoken of as being a bright scholar, and acquired a good knowledge of books. He served his apprenticeship with Mr. Hughes, corner of Eighth and Race Streets, Philadelphia, graduated from the Philadelphia College of Pharmacy in 1873, went to New York in the spring of 1874, and was engaged with Mr. Armstrong, on Fulton Street, until his death. The deceased was an active and valuable member of the New York Alumni Association of the Philadelphia College of Pharmacy. By those intimately acquainted with him he is spoken of as being a faithful student, and for him a brilliant career was pictured. By the death of Mr. Hommann the pharmaceutical world has lost one of its promising and useful young laborers. He became a member of this Association at Boston in 1875.

Peter J. Hassard, a life member of this Association, died of consumption October 31st, 1875, in Bangor, Maine, aged fifty-one years. Mr. Hassard was born in Hopkinson, Rhode Island, March 5th, 1826. During his infancy the family removed to Nantucket, where he remained till he was fourteen or fifteen years old, whence he went to Boston, where he served his apprenticeship to the apothecary business with Mr. Metcalf, at 39 Tremont Street. He remained there as assistant, and the latter part of the time with Mr. Burnett as partner till the autumn of 1853. From Boston he went to California, and formed a copartnership in the drug business with Mr. Keith in San Francisco, and remained there about two years. In 1858 he went into business in Philadelphia at the corner of Twelfth and Chestnut Streets, where he remained ten years. It was during this period that his health was permanently undermined by unremitting and exhausting devotion to his business. The last few moments of his life were very peaceful and serene notwithstanding his great physical suffering. Mr. Hassard was one of the oldest members of the Association, having been elected in 1853 at Boston.

John W. Smith died in Norfolk, Virginia, April 22d, 1876, aged thirty-two years, of albuminuria. Mr. Smith was of English parentage, but had resided in Norfolk from childhood. He received the advantages of an academic education in the best schools of Norfolk. The deceased began his apprenticeship to the drug business with Messrs. Seal & Neuton. He afterwards formed a copartnership with the Archers, and subsequently commenced business for himself, which he prosecuted with success until his death. He at all times commanded, in a very large measure, the confidence, respect, and patronage of the community in which he lived. Several months prior to his death he suffered intensely from nephritic pains, accompanied by great depression of spirits. Despite the encouragement of friends, he was always full of apprehension and forebodings for the future. He felt,

> "The little rift within the lute,
> That by and by would make the music mute,
> And ever widening slowly, silence all."

The rapid and sudden termination of his disease proved the reality of his fears. Mr. Smith is spoken of by those best acquainted with him as being a Christian in deed as well as in name, and was a consistent member of the Episcopal Church and a Sunday-school teacher. In his family he was kind and generous, and a model of thoughtful and provident affection. In his business he was intelligent, high-toned, and thoroughly honest in his transactions, and as an apothecary by his accuracy, dispatch, urbanity, and general integrity, he was universally respected. Deceased leaves a wife and two children. He was elected a member of this Association in 1873 at Richmond, Va.

DR. CONRAD J. GEIGER died very suddenly of apoplexy January 6th, 1876, aged sixty-four years, ten months, and twenty days. The deceased was born in Eppingen, Duchy of Baden, Germany, February 11th, 1811. He emigrated to the United States with his parents, and arrived at Baltimore, Maryland, August 19th, 1819. From thence they proceeded to Ohio, where they arrived in October, and settled in Brown Township, Carroll County. He was married to Miss L. A. Adams, at Paris, Ohio, and went to Canton in 1856, where he resided the remainder of his life. He is spoken of by the residents of Canton as a highly esteemed and respected citizen, a man of sterling worth and high qualities of head and heart. He was for some years one of the Township Trustees, and discharged the duties of the office with much credit. At the time of his death he was one of the Infirmary Directors of the county in which he lived. As a pharmacist he was able, and owing to his high standing as such established an excellent business. Mr. Geiger leaves a wife and a large family of sons and daughters to mourn their irreparable loss. The deceased connected himself with this Association at Detroit in 1866.

JONATHAN C. MATTERN, a life member of this Association, died at Pittsburg, Pa., January 20th, 1876, of consumption, aged forty-two years, one month, and twenty-one days. Mr. Mattern was born at Warrior's Mark, Huntingdon County, Pa., November 30th, 1833. He commenced his apprenticeship to the apothecary business with Mr. Benjamin Page, and remained in Mr. Page's employ seven years, after which Mr. Page sold the store to Dr. G. Weyman, who had the store some three years, during whose proprietorship the store was well managed and an excellent business and reputation established. During Dr. Weyman's ownership Mr. Mattern still continued in the capacity as clerk. On the death of Dr. Weyman, which was quite sudden, Mr. Mattern then purchased the store, where he spent the remainder of his life, passing through the various grades of apprentice, assistant, and sole proprietor; executing and sustaining at all times his profession with zeal, dignity, and industry. Although a good business was already established, it was not long before he increased the same, and was doing a large and successful and remunerative business at the time of his death. The cause of his death no doubt was partially due to the steady application to business and the arduous duties of the store, the result of which was he left his family, consisting of a wife, five children, four girls and one boy, in comfortable circumstances. He became a member of this Association in 1860 at New York City. The deceased was an honorable and fair-dealing man, a sociable and amiable gentleman, and an eminent scholar in his profession. The children lose a kind father, the wife a good husband, and the community in which he lived a respected and beloved citizen. Mr. Mattern filled several positions of public trust, as councilman for several years, and at the time of his death was a director in one of the banks.

Henry Schmid, of New York City, died there November 3d, 1875, in the fifty-ninth year of his age. Mr. Schmid was a member of the New York College of Pharmacy, and also a member of the German Apothecaries Association. He became a member of this Association in 1874 at Louisville, Ky.

Henry A. Suding, of Baltimore, Md., died there in 1875. Mr. Suding was a graduate of the Maryland College of Pharmacy. He became a member of this Association in 1870 at Baltimore, Md.

Charles Henry Warren, of Brandon, Vermont, died there quite suddenly and recently. He connected himself with this Association in 1872 at Cleveland, Ohio.

Edward A. Smith, of Baltimore, Md., died there in 1875. Mr. Smith was a graduate of the Maryland College of Pharmacy. Deceased connected himself with our Association in 1870 at Baltimore, Md.

Francis Singleton Gaither died suddenly in the city of Washington, on the night of the 12th September, 1876. His death was from hæmorrhage of the lungs, and occurred whilst in his store engaged in business. Mr. Gaither was born in Georgetown, D. C., on the 27th of November, 1836. He received a "common-school" education, and in the year 1856 engaged in the study and practice of pharmacy in the store of Dr. D. D. Taulman, in Washington, where he remained until 1863, becoming proprietor in 1861. In 1863 he accepted a position in the Treasury Department, which he resigned in 1864, and again engaged in the practice of pharmacy, opening a store at the corner of Ninth and H Streets, which he successfully conducted unto the time of his death. In 1867 Mr. Gaither married a distant relative, Miss Sallie S. Gaither, who with their only child survives him. Mr. Gaither was a charter member of the National College of Pharmacy, and was elected a member of the American Pharmaceutical Association in 1860. He has at all times cheerfully assisted in every laudable undertaking to advance the higher interests of pharmacy, yet at the same time studiously avoiding any position of prominence or notoriety to which his acquirements so justly entitled him; ever willing to labor for the benefit of all, never claiming any honor for himself. His disinterested labors in behalf of pharmacy were so fully appreciated by the College, that the members would have conferred upon him their highest office could they have persuaded him to accept it. He was twice elected Vice-President of the College, and once to the chair of the Theory and Practice of Pharmacy. On accepting the latter position he at once began the preparation of his lectures, which soon proving too great an additional tax on his already failing health, he was on this account, much to the regret of the board of trustees, compelled to resign. Mr. Gaither devoted his studies more to pharmaceutical chemistry than to any other department of pharmacy, pursuing them with unabated diligence until his death. His accomplishments in this branch were in advance of any of his contemporaries in the district, and his loss to the College in this regard is irreparable. Mr. Gaither graduated from the Medical Department of the Columbian University, D. C., as a Graduate in Pharmacy in 1870. In 1873 he matriculated with the National College of Pharmacy, and after a successful examination received his diploma as Doctor of Pharmacy. Mr. Gaither was a man of sterling character, inflexible in the discharge of every duty, never permitting any personal consideration to swerve him from their faithful performance, at the same time he always exhibited the most delicate appreciation for the feelings of others, a high regard for the rights and opinions of his fellows marking all his intercourse with them. Truth, honesty, and virtue had in Francis S. Gaither a devotee, who never allowed their fires to grow dim on his altar.

I regret exceedingly that the notices of four deceased are so concise. I only heard of their demise a few days prior to the meeting, and have written for particulars to some members, hoping to have more satisfactory notices in time for publication.

I wish all those connected with our Association would bear in mind the importance of notifying the Chairman of the Executive Committee when they hear of the death of any member, and if convenient to furnish him with an obituary notice.

The above communication includes all the particulars of importance that have come to the notice of your chairman, and in concluding my report I desire to express my thanks to the Permanent Secretary, Treasurer, and all other members, who so promptly responded when their services were required.

Yours, etc.,

GEORGE W. KENNEDY,

Chairman Executive Committee American Pharmaceutical Association.

POTTSVILLE, PA., September 9th, 1876.

The Permanent Secretary read the following annual report:

REPORT OF THE PERMANENT SECRETARY.

TO THE CHAIRMAN OF THE EXECUTIVE COMMITTEE:

The early publication of the Proceedings for the year 1875 is in a great measure due to the promptness of the efficient reporter on the Progress of Pharmacy, who not only had his report ready for the printer, but with great courtesy had likewise responded to the Secretary's request to furnish him with the list and drawings of the illustrations needed, previous to the annual meeting, so that the engravings could be prepared beforehand, and were ready for use immediately after adjournment. Of the illustrations which embellish the Report on the Progress of Pharmacy in the last volume, two cuts were kindly loaned for the purpose by the American Philosophical Society, and for the gratuitous use of seven or eight others we are indebted to the "American Journal of Pharmacy." The great size which the last volume has attained (900 pages) makes it desirable that some slight typographical changes should be adopted, whereby the amount of reading matter contained upon each page may be materially increased, and consequently the size of the volume be correspondingly diminished. This will probably be attempted with the next volume.

Early during the past season the Secretary corresponded with the various pharmaceutical societies in relation to the appointment of committees, to whom visiting pharmacists from foreign countries might be referred, in accordance with a resolution adopted at the previous meeting. The recommendation was promptly acted upon, and the names of the gentlemen constituting the various local committees were communicated to the Secretary. As yet, however, there has been but little occasion for active service for most of these committees.

Pursuant to a resolution passed at the last meeting, the following letter was addressed to the various pharmaceutical societies of foreign countries:

American Pharmaceutical Association.

OFFICE OF THE PERMANENT SECRETARY,
PHILADELPHIA, May, 1876.

TO THE PRESIDENT OF THE ———

HONORED SIR: The International Exposition has just been opened in the City of Philadelphia, and during its progress the American Pharmaceutical Association will hold its twenty-fourth annual meeting in the same city, on the 12th day of September next. It is hoped that many pharmaceutists and druggists of your State will embrace this opportunity to pay a visit to the United States, and we take great pleasure, on behalf of our Association, in cordially inviting them, through your honorable society, to so make their arrangements as to meet this Association at its next annual meeting.

It likewise affords us pleasure to inform you and the members of the society which you represent, that the Philadelphia College of Pharmacy has opened a bureau where information such as may be desired by strangers will be freely given to all visiting pharmacists and druggists daily, between the hours of 9 A.M. and 6 P.M.

Hoping to meet you and many colleagues of your country, in September next, we have the honor to remain, dear sir,

With fraternal greeting,

GEORGE F. H. MARKOE,
Pharmacist in Boston, President Amer. Phar. Assoc.
JOHN M. MAISCH,
Permanent Secretary.

This invitation has been brought to the notice of our pharmaceutical brethren through the various journals, and has also been acknowledged from the presiding officers of some of the associations by letters, which are placed before the President. According to information received, several pharmacists contemplate a visit to this country about the present time, but from other sections regret has been expressed that the great distance will prevent others from attending.

The expenses of publishing the Proceedings last year were as follows, as will be seen from the bills paid by the Treasurer:

Phonographic Report,	$150 00
Woodcuts,	109 75
Steel Engraving,	58 50
Composition and Printing,	2091 75
Binding,	333 72
Journals, etc., for use of Reporter on the Progress of Pharmacy, and binding the same,	137 55
	$2881 27

To this sum must be added the salaries of the Reporter and Editor, amounting to $1100, and the incidental expenses of the Secretary during the past year, amounting to $429.98. These make the total expenses directly incurred in the preparation of the manuscript, the publication and distribution of the Proceedings, and the preservation of the property of the Association, amount to $4411.25 for the past year; which sum, however, does not include the salary of the Treasurer, travelling expenses, expenses incurred in the collection of dues, etc., all of which should be charged against the cost of our annual publication. The incidental expenses referred to were incurred for the following items:

Telegrams,	$4 65
Printing of Applications, Circulars, etc.,	30 00
Woodcuts not otherwise accounted for,	3 50
Journals, etc., not otherwise accounted for,	59 85
Packing-boxes, Packing-papers, etc.,	14 38
Freight and porterage,	152 35
Postage-stamps,	144 00
Shelving,	3 75
Fire Insurance,	17 50
Total,	$429 98

By reference to last year's report, it will be seen that during the preceding year the expenses for porterage, freight, and postage-stamps were $188.20, against $296.35 for the same items during the year just closed, an increase of $108.15. This increase was not unexpected, but was pointed out in the Secretary's report for last year, and there estimated to probably reach at least $100. Only a small portion of this sum must be attributed to the increase in membership and the large size of the volume; it has been due mainly to the high rates of postage for printed matter (1 cent per ounce) which prevailed at the time, but have since very properly been reduced to the old rates of one cent for two ounces, so that a corresponding decrease may be expected during the ensuing year. In 1874 the Secretary reported expenses for freight and postage amounting to $286.10, or only $10.25 less than during the year just closed.

During the past year quite a number of the Proceedings for 1854 have turned up in Boston, and were sent to Philadelphia for storage with the other books. It will be remembered that the Proceedings for 1854 and 1856 have been, for years past, announced as being out of print, and it is not impossible that some of the latter year might be found in some of the larger cities, although twenty years have elapsed since they were published. Those who desire to obtain the Proceedings for 1854, to render their set more complete, can obtain copies from the Secretary for 25 cents.

The entire stock of the Proceedings stored in the building of the Philadelphia College is now as follows:

1851.	321 in paper.		
1852.	98 “		
1853.	100 “		
1854.	73 “		
1855.	114 “		
1857.	255 “	21 bound.	
1858.	60 “	21 “	130 loose.
1859.	—	38 “	
1860.	—	208 “	
1862.	—	283 “	
1863.	—	262 “	
1864.	183 “	115 “	
1865.	154 in paper,	27 bound.	
1866.	72 “	76 “	
1867.	152 “	94 “	
1868.	61 “	144 “	
1869.	105 “	145 “	
1870.	114 “	71 “	
1871.	101 “	65 “	
1872.	98 “	4 “	
1873.	23 “	101 “	
1874.	128 “	36 “	
1875.	70 “	61 “	

Index for 1852–59, 20 in paper.
“ 1860–69, 217 “

The insurance on the books has been continued in the German Fire Insurance Company of Philadelphia, in the sum of $2500, at an annual premium of $17.50.

In addition to the usual exchanges, the Secretary has received for the Association a copy of the new Pharmacopœae Helvetiæ Supplementum, which, with the letter accompanying it from the Swiss Apothecaries' Society, is placed upon the table; also Part II of the Medical and Surgical History of the War of the Rebellion, from the Surgeon-General United States Army.

By a resolution passed at the annual meeting held in 1872, the albums belonging to the Association were placed in charge of the Secretary, but for several years past have remained in the custody of the special committee to complete their arrangement during the time between the meetings. The Secretary would suggest that either the above-mentioned resolution be rescinded and the special committee be made a standing committee, if deemed of sufficient importance, or else what appears to be the simpler plan, that the special committee be discontinued, and its duties transferred to the Executive Committee.

The Secretary would also suggest that the Committee on Legislation be made a permanent one, if it is considered important enough. Of late years it has confined itself to giving advice on matters connected with the legal regulation of the practice of pharmacy if applied to, and with the collection of the recently enacted laws bearing on this subject, without taking the initiatory steps towards such legislation.

Through the liberality of our former president, Albert E. Ebert, the Association is in possession of a fund from the interest of which a prize may be annually awarded. Until now a special committee was appointed to decide upon awarding the prize. The time seems to have arrived when a standing committee on prizes should be created.

All of which is respectfully submitted.

JOHN M. MAISCH,
Permanent Secretary.

On motion, it was resolved that the address of the President and the annual reports of the Executive Committee and Permanent Secretary be referred to a special committee of five.

The Association then adjourned, to meet again on Thursday morning at 9 o'clock.

Second Session.—Thursday Morning, September 14th.

In the absence of the President, the meeting was called to order by the First Vice-President, Fr. Hoffmann.

After the reading and approval of the minutes of the First Session, the Secretary read the following letters received in answer to the invitation extended by this Association, and the letters were, on motion of Dr. Squibb, ordered to be placed on file and entered on the minutes.

DANMARKS APOTHEKER FORENING, ODENSE, June 26th, 1876.

TO THE PRESIDENT OF THE AMERICAN PHARMACEUTICAL ASSOCIATION, PHILADELPHIA.

DEAR SIR: I thank you very much, in the name of my colleagues, for the kind invitation of the American Pharmaceutical Association to attend its Twenty-fourth Annual Meeting on the 12th September, at Philadelphia.

I have brought the invitation to the knowledge of all the Danish pharmacists, and communicated them, that if any of them would profit of your kind attention, papers of legitimation would be sent them by addressing me, in order to prove their membership in our Association.

I have the honor to remain, dear sir,

With collegial greeting,
GUSTAV LODZE,
President for "Danmarks Apotheker Forening."

DER SCHWEIZERISCHE APOTHEKERVEREIN.

TO THE PRESIDENT AND SECRETARY OF THE AMERICAN PHARMACEUTICAL ASSOCIATION, PHILADELPHIA.

GENTLEMEN: We have just received your kind invitation for the Annual Meeting of your Association, to be held in September during the International Exposition. We shall take care to inform the members of our Society in one of the next Nos. of our Journal; in the meantime please to accept our best thanks and the assurance of our sincere esteem.

We remain, with confraternal and kind regards,

Very sincerely yours,
For the Swiss Pharm. Society,
[SEAL.] PROF. EDWARD SCHAER,
President.

ZURICH, 22d June, 1876.
To the American Ph. Association, Philadelphia, U. S. A.

DIRECTORIUM DES DEUTSCHEN APOTHEKER VEREINS,
AUGSBURG, den 13ten August, 1876.

HERRN JOHN M. MAISCH,
Per. Sec'y der American Pharmaceutical Association in Philadelphia.

GEEHRTER HERR: Indem wir für gütige Uebersendung Ihres letzten Versammlungsberichtes, sowie für Ihre freundliche Einladung zu Ihrer in Philadelphia demnächst stattfindenden Generalversammlung unseren besten Dank abstatten, bedauren wir lebhaft letzterer nicht nachkommen zu können, da auch unser Verein vom 5 bis 7ten September, d. J. in Stuttgart seine jährliche Generalversammlung abhält.

Wir erlauben uns, Sie zu dieser Versammlung ergebenst einzuladen und verbleiben

Mit ausgezeichneter Hochachtung,
Das Directorium des Deutschen Apotheker Vereins,
F. WOLFRUM, VORSITZENDER.

TRANSLATION.—In presenting our best thanks for the kind transmission of your last Proceedings, as well as for your friendly invitation to your annual meeting shortly to be held in Philadelphia, we regret very much not to be able to respond to the latter, since our Society will likewise have its annual general meeting from September 5th to 7th, at Stuttgart. We take leave to respectfully invite you to this meeting, and remain, etc.

Mr. J. P. Remington, on behalf of the Reception Committee, introduced Mr. S. Nagayo, chief of the Imperial Board of Health and Director of the Medical College of Tokio, Japan; Mr. H. Meiyake, Professor at the Medical College of Tokio, and Commissioner of the Imperial Board of Health, Japan; and Mr. S. Iwanaga, Commissioner of the Imperial Board of Health, Japan; and moved that these gentlemen, distinguished men of science of Japan, be invited to take seats.

The motion was seconded by Dr. Squibb, with the amendment that the gentlemen be warmly welcomed by the Association, and was carried unanimously. The guests were conducted to seats upon the platform.

The Secretary read a letter from Messrs. Page, Kidder & Blanchard inviting the members to visit their exhibit of coal-tar products in the Main Building of the Centennial Exposition, and stated that the Committee of Arrangements had received verbal invitations from the large majority of American and foreign exhibitors of chemical and pharmaceutical products, with the offer of facilities for examining the goods when accompanied by a member of the Arrangement Committee. The invitations were, on motion, accepted with thanks.

The Nominating Committee presented the following report:

To the American Pharmaceutical Association:

The Nominating Committee appointed by your Association would respectfully recommend the *election* of the following candidates nominated by this committee:

For President.

Charles Bullock, ... Philadelphia, Pa.

For First Vice-President.

Samuel A. D. Sheppard, ... Boston, Mass.

For Second Vice-President.

Gustavus J. Luhn, ... Charleston, S. C.

For Third Vice-President.

Jacob D. Wells, ... Cincinnati, Ohio.

For Treasurer.

Charles A. Tufts, ... Dover, N. H.

For Permanent Secretary.

John M. Maisch, ... Philadelphia, Pa.

Reporter on Progress of Pharmacy.

C. Lewis Diehl, ... Louisville, Ky.

Local Secretary.

The committee recommend that the appointment of the Local Secretary be made by the President and Permanent Secretary.

Executive Committee.

George W. Kennedy (Chairman),	Pottsville, Pa.
Charles W. Dalrymple,	Morristown, N. J.
William H. Crawford,	St. Louis, Mo.
John Ingalls,	Macon, Ga.
John M. Maisch, Permanent Secretary, *ex-officio*,	Philadelphia, Pa.

Committee on Drug Market.

William Saunders (Chairman),	Ontario, Can.
William H. Wickham,	New York.
John F. Judge,	Cincinnati, O.
N. Gray Bartlett,	Chicago, Ill.
Christian F. G. Meyer,	St. Louis, Mo.

Committee on Papers and Queries.

William McIntyre (Chairman),	Philadelphia, Pa.
Louis J. Dohme,	Baltimore, Md.
Joseph L. Lemberger,	Lebanon, Pa.

Business Committee.

Joseph Roberts,	Baltimore, Md.
Henry S. Wellcome,	New York.
Charles Rice,	New York.

Respectfully submitted,

Charles A. Tufts, *Chairman.*
J. D. Wells, *Secretary.*

President Markoe arriving, took the presiding officer's chair.

On motion of Dr. Squibb, the Secretary was directed to deposit an affirmative ballot for the President and Vice-Presidents as nominated. This being done, the President announced the election of these officers.

It was further moved that the Secretary be directed to cast an affirmative ballot for the Treasurer and Permanent Secretary. The motion was agreed to, and the election of said officers announced by the President.

Dr. Squibb now moved that the report of the Nominating Committee be adopted and confirmed in whole.

Mr. Saunders.—Before that is put to the meeting I wish to say a word. I see my name is put in the list as chairman of the Committee on the Drug Market. The facilities I have for obtaining any information are so small, and my time is so much occupied, that I must beg leave to decline that honor. I do not like to object to any of the honors the gentlemen of the Association may confer upon me, but in this instance I feel I could not undertake it with any probability of doing the work successfully, and would like them to nominate some other in my place.

Dr. Squibb.—I think the Association will be very glad if Mr. Saunders will consent to do his best. We know it is very difficult to get a chairman for this committee. We know it is a difficult subject, and we do not expect that the chairman of this committee shall embrace the whole ground. If Mr. Saunders will embody his own experience, and what may come under his own observation, I am sure the Association will be very thankful to him, and not put him to any great labor.

Mr. Colcord.—I had the honor to nominate Mr. Saunders as chairman of that committee. I did it for the purpose of having that subject treated in a different manner from what it has been treated in years past. Not that I had any objection to that way, but I wanted some departure on that subject, and selected Mr. Saunders for the chairmanship of that committee with the view of having something new from the committee. I hope he will accept.

Mr. Remington.—I think the nomination is a manifestly proper one. They get different kinds of drugs in the part of the country that Mr. Saunders comes from, Canada, and I think, with Mr. Colcord, that a report on the drug market from that part of the country would be very acceptable to the Association. I hope Mr. Saunders will consent to act.

Mr. Saunders.—I accept the kind expressions of feeling on the part of my fellow-members, and will do the best I can; but my chief objection was, I felt I was not in a position to do anything, and do not like to take any work if I cannot make a creditable exhibit at the close of the year.

The President appointed Dr. E. R. Squibb and Dr. Fr. Hoffmann to conduct the President elect to the chair.

Dr. Squibb.—I have the honor of introducing your new President, Charles Bullock, of Philadelphia.

President Markoe.—It becomes my very pleasant duty to surrender to you the badge of your office. It is exceedingly pleasant to surrender it into the hands of one who has labored so long and well for the good of the Association, and I know I express the feeling of the Association when I say I have no doubt its interests will receive every attention at your hands.

President Bullock.—Gentlemen, I thank you for the compliment which you have conferred upon me, a compliment which I appreciate the more, remembering the worthy men who have heretofore presided over your deliberations. Some of them are no longer here, but they speak to us from our volumes of transactions, and their familiar faces are kept in mind by their portraits on our walls. That face, showing tranquillity of mind, at peace with itself and with his fellow-men, reminds us of Charles Ellis, our President in 1857, and for many years President of this College, who since our last meeting has ceased from his labors, with the full measure of the high respect and love of all who knew him.

A sentiment has been entertained by some members of this Association who are active in its affairs, that our interest would be consulted by selecting for presiding officer a non-resident of the place of meeting. For once I unite with them in this sentiment. It would give me pleasure to see the chair occupied on this occasion by a representative from one of our new States, an offspring of the old thirteen, who here in this city pledged themselves for better or for worse, and whose diamond wedding we now celebrate. As you, my friends, have thought differently, I defer to your judgment, and accept the honorable position to which you have called me, conscious of my deficiencies, and relying on your generous forbearance and kindly support.

I fear our attention will be somewhat distracted by the Centennial, but I trust you will not forget the purposes for which we are here assembled. The volume of our Proceedings for 1876 should not, like a starved child, show the want of proper pabulum. Your determination to devote each alternate day to the Exposition was, I think, a judicious one. An interchange of opinions and criticisms of the exhibits which come within the scope of our department will render visits there more interesting, and, while we have much to learn, I doubt not you will all feel gratified that our American pharmacists and chemists have shown so much skill and knowledge. Our colleges of pharmacy and this Association have been instrumental in making this good record at our first Centennial Exposition.

The exhibition of new drugs indigenous to the different countries of the globe are well worthy of your attention. They are of standard authority, and a study of them will add to our knowledge of materia medica. Cinchona barks, ipecacuanha, and the various forms of opium are an humble exhibit when ranged by the side of the precious metals and the master works of art, but you, gentlemen, know their value. Diamonds cannot break chills, nor gold give repose to the troubled brain. To be able to measure all things by their proper standard of value would be a rare gift. Who can attain to it?

I trust, gentlemen, that our proceedings will be marked by the harmony which has characterized our former meetings, that you will find enjoyment mingled with instruction during your stay in our city of plain ways, and that when we separate it will be with renewed interest in the progress of pharmacy, with enlarged charities for differences of opinion and customs, and with a more extended good will towards the nations who at this time are honoring us by their presence.

Dr. Squibb introduced to the Association Dr. T. G. Wormley, of Columbus, Ohio, author of "Microchemistry of Poisons," and Mr. Remington called attention to the presence of the venerable Mr. Henry T. Kiersted, of New York, formerly President of the Association. Both gentlemen were invited to seats upon the platform.

The Secretary announced that since the last session the following credentials had been received: From the Alumni Association of the Cincinnati College of Pharmacy; from the Pharmaceutical Association of South Carolina, and from the Mississippi State

Pharmaceutical Association. On motion, the credentials were referred to the Committee on Credentials, and the delegations not previously admitted were admitted.

The Treasurer read his annual report, as follows:

To the Officers and Members of the American Pharmaceutical Association:

Gentlemen: Agreeably to the requirements of the constitution, I herewith present a report of the transactions of this office for the past year. All the bills of which I have any knowledge have been paid, and there is a balance in the treasury of nine hundred and forty-one dollars and thirty-three cents. This sum does not include the Ebert fund, or the amount received for a Life Membership, which is invested, and the interest of which only is used.

I would renew the request previously made, that members would confer a favor on the officers of the Association if they would at once report to them any change made in location, or a change in the street of their city or town, with their business number on said street. Members complain that errors are made in the spelling of their names. If any member discovers an error in his own or in the name of any other member, we should be pleased to have him inform the Secretary or Treasurer of it, when it will be at once corrected.

When an applicant signs the constitution, he also signs an obligation to return his certificate should he cease to remain a member of the Association. This promise is almost entirely ignored, and no attention is often paid to a request to comply with the promise. I have the names of a large number of members, some of whom have had no connection with the Association for several years, but who still retain their certificates of membership.

A large number of members should be dropped from our rolls for non-payment of dues, unless their indebtedness is paid before the report of the proceedings is ready for publication. The members have more generally responded to his applications than the dulness of all business matters had led the Treasurer to fear might be the case.

A change in my business location, and other causes beyond my control, have caused my correspondence with the members, during a portion of the past year, to be much disturbed. I trust this may not be the case hereafter.

I would again sincerely thank the accredited agents of the Association for their kind assistance. My intercourse with them, and with all the members, during the past year has been of the most pleasant character.

Statement of the Receipts and Disbursements of the American Pharmaceutical Association for the year ending September 12th, 1876.

1875.		RECEIPTS.	
Sept.	7.	To balance on hand as per last Report, ...	$1174 11
1876.			
Sept.	9.	To amount received for Contributions, ...	4262 00
"	"	" " " from the sale of Certificates, .	420 00
"	"	" " " " " Proceedings, .	64 89
			$5921 00

Disbursements.

1875.						
Sept.	7.	No. 1.	By cash	paid	James H. Slade, Phonographic Report, ...	$50 00
"	"	" 2.	"	"	C. Lewis Diehl, Report, . .	150 00
"	13.	" 3.	"	"	John M. Maisch, Expenses, .	35 60
"	20.	" 4.	"	"	" " " .	25 00
"	20.	" 5.	"	"	Charles A. Tufts, " .	26 79
"	22.	" 6.	"	"	C. Lewis Diehl, Report, .	250 00
"	"	" 7.	"	"	James H. Slade, Phonographic Report, ...	100 00
Oct.	2.	" 8.	"	"	William M. Clark, Proceedings,	109 09
"	2.	" 9.	"	"	Ig. Kohler, Expenses, . .	23 85
"	2.	" 10.	"	"	Ig. Kohler, " . .	82 10
"	16.	" 11.	"	"	E. & H. T. Anthony, Album, .	20 17
1876.						
Jan.	11.	" 12.	"	"	Clemmons Parrish, Proceedings,	58 50
Mar.	11.	" 13.	"	"	John M. Maisch, Expenses, .	325 88
"	11.	" 14.	"	"	American Bank Note Co., Certificates, ...	68 50
Feb.	7.	" 15.	"	"	Sherman & Co., Proceedings, .	600 00
June	2.	" 16.	"	"	William Rutter & Co., Proceedings, ...	200 00
Aug.	1.	" 17.	"	"	Sherman & Co., Proceedings, .	300 00
"	1.	" 18.	"	"	William Rutter & Co., Proceedings, ...	133 72
"	5.	" 19.	"	"	Sherman & Co., . . .	1202 75
"	12.	" 20.	"	"	John M. Maisch, Expenses, .	100 00
"	14.	" 21.	"	"	John M. Maisch, " .	100 00
"	16.	" 22.	"	"	John M. Maisch, " .	100 00
"	18.	" 23.	"	"	Charles A. Tufts, " .	400 00
Sept.	8.	" 24.	"	"	John M. Maisch, " .	300 00
"	8.	" 25.	"	"	Charles A. Tufts, " .	64 74
"	8.	" 26.	"	"	John M. Maisch, " .	68 50
"	8.	" 27.	"	"	Charles A. Tufts, " .	84 48
						$4979 67
	Balance to new account, ...					941 33
						$5921 00

E. E. All of which is respectfully submitted.

Charles A. Tufts,
Treasurer.

The report was, on motion, accepted and ordered to be referred to an auditing committee, to which the President appointed Messrs. George Leis, of Lawrence, Kansas; James T. Shinn, Philadelphia, and John Ingalls, of Macon, Georgia. Dr. Squibb suggested that the balance left in the hands of the Treasurer be placed in some savings institution for the benefit of the Association.

MR. SHINN.—In his report, the Treasurer refers to the possession of certificates by those who are no longer members. It might strengthen his position if the Association was to instruct him to demand fairly the return of those certificates. I move that the Treasurer be instructed to notify those who were, and are not now, members to return their certificates to the Association.

MR. ROYCE.—In connection with the return of certificates, I would like to ask the question whether, in case of the death of a member, his certificate is to be returned from his estate?

DR. SQUIBB.—No, sir.

THE PRESIDENT.—Not if he dies not in arrears.

DR. SQUIBB.—Not even if he dies in arrears.

Mr. Shinn's motion of instruction to the Treasurer was agreed to.

The report of the Committee on the Revision of the By-Laws was, in accordance with instructions received at the last meeting, put in print. It was resolved that the printed copies be distributed among the members present, and that the report be called up at a subsequent session. The report is as follows:

TO THE AMERICAN PHARMACEUTICAL ASSOCIATION.

GENTLEMEN: The committee appointed under the resolution (page 825 of Proceedings of 1875), "to report what changes or amendments may be necessary in the by-laws of this Association, and that the action of the committee be printed for the use of the members at our next meeting," respectfully report, that an examination of the by-laws of the Association, and a knowledge of their efficiency in years past, has led your committee to the conclusion that no *alterations* of the existing by-laws are necessary or desirable for regulating the several purposes for which they were framed.

The proposition of Mr. P. W. Bedford (page 795 of Proceedings), to amend Art. I, chapter 7, on membership, so as to read "teachers of Pharmacy, Chemistry, and Botany *in established* schools of Pharmacy," your committee would prefer leaving to the judgment of the Association, without any expression of their judgment in this place. The action of the Association, however (page 825), implies a reference to your committee of the proposed change.

The proposition of Mr. Bedford has been carefully considered by your committee, as the subject is an important one. The proposed change is in accord with the Constitution of the Association, and *would seem* important to prevent the gradual introduction of members having but little affinity with the purposes of the Association.

This view of the subject appeals, however, to your committee as a narrow one, and not fraught with the objections at first opposing. Pharmacy occupies a wide domain. A laborer in any of the fields from which are gathered results making up, extending, or improving our Materia Medica, if laboring "with *a special interest* in Pharmacy and Materia Medica," is not likely to be in antagonism with the purposes of this Association.

The present by-law, if amended so as to read "teachers of Pharmacy, Chemistry, and Botany, *in established schools of Pharmacy*," would open the question as to what constituted "*established schools of Pharmacy*." The judgment of the Association as to the respectability and standing of such schools, and not the dictionary, would be the only safe guide. Your committee think the Association will, as it has heretofore done, guard the interpretation of the by-law in the spirit of its intention, without subjecting themselves to the imputation of being a mere business association or guild.

Your committee would propose an addition to Chapter VI, Article I, of committees, adding, after Business Committee, one "on Prize Essays" and one "on Legislation;" and to the same Chapter VI, add Articles XI and XII, as follows:

ARTICLE XI. The Committee on Prize Essays shall, within six months after the annual meeting at which the essays are presented, determine upon which, or any of them, has met the requirements of the founder of the prize. In all other respects they shall be governed by the stipulations expressed by the donor. The decision of the committee may be published in the journals of pharmacy in advance of the annual meeting of the Association.

ARTICLE XII. The Committee on Legislation shall keep a record of, and compile for reference, the enactments of the different States regulating the practice of pharmacy and the sale of medicines. They shall report to each stated meeting of the Association what legislation on the subject has occurred during the year.

Respectfully submitted,
CHARLES BULLOCK,
S. M. COLCORD,
E. P. NICHOLS,
Committee.

The Secretary read the report of the Committee on the Ebert Prize, which was, on motion, accepted and adopted.

TO THE PRESIDENT OF THE AMERICAN PHARMACEUTICAL ASSOCIATION:

The committee on the "Ebert Prize" respectfully report that they have examined the papers presented at the last meeting of the Association, and found the majority of them to be creditable to their authors and to the Association in whose proceedings they have been published.

The conditions governing the award, as stipulated by its founder, are such that the majority of the papers offered to the Association, although valuable and instructive, do not come within the scope intended as competing for the award. A critical examination of the papers resulted in limiting the number to those on phosphoric acid and on pancreatin. Regarding these the committee would respectfully offer the following remarks:

On phosphoric acid three valuable papers were presented, one of which, by Professor Markoe, suggests a new process for preparing diluted phosphoric acid, by the action of bromine upon phosphorus in the presence of nitric acid. This is an important modification of Pettenkofer's process, proposed in 1866, wherein the oxidation of the phosphorus is effected by the agency of iodine and subsequently water, some nitric acid being finally used to effect the complete oxidation of any phosphorous acid present. While the committee acknowledge the entire safety of the new process if properly managed, yet they cannot refrain from taking into consideration the slowness of the process if conducted without very frequent supervision, but more especially the introduction of a new element of danger, requiring certain precautions; and they cannot admit that any danger is connected with the more expeditious Pharmacopœia processes, even when carried out on a large scale, if the directions of the Pharmacopœia, particularly in regard to the strength of the nitric acid, are adhered to.

Mr. Louis Dohme's and Professor Remington's papers treat substantially of the same subjects, though the former enters more deeply into the conditions connected with the conversion of one into another variety of phosphoric acid. Both papers point out a notable difference in the strength of the dilute phosphoric acid as prepared by the two processes of the Pharmacopœia, and notice again the presence of impurities (soda) in the commercial glacial acid, which *retard* but do not *prevent* its complete change into orthophosphoric acid.

Graham, in his classical investigations of the phosphoric acids, has shown that the glacial acid may become contaminated with impurities from the vessels in which it may be prepared, and such impurities were proven to exist in commercial acid as early as 1860 (Amer. Jour. Phar., 1860, p. 193). The introduction of soda for the purpose of hardening glacial phosphoric acid was first noticed by Brescius in 1867, and subsequently confirmed by Prof. Prescott, and by the authors of the two papers mentioned. Regarding the conversion of meta- and pyrophosphoric into orthophosphoric acid Graham has observed that it may be done, by boiling their aqueous solutions, more rapidly in the presence of free mineral acids. The conversion with water alone is best effected, according to Littleton Thompson (1874), by heating the concentrated solution, for which purpose Mr. Dohme finds a temperature of from 280° to 300° F. to be required.

The aqueous solutions of metaphosphates were found by Graham to be converted gradually into orthophosphates, but to effect a similar change of the pyrophosphates the presence of a mineral acid was found necessary, and, according to Weber, the most rapid change is produced by sulphuric acid. Reynoso, however, succeeded in 1852 in changing the meta- and pyrophosphates readily into orthophosphates by exposing their solutions to a temperature of 280° C. (536° F.). As far as the behavior to ferric chloride is concerned the conversion may be completed by prolonged boiling in the presence of nitric acid.

The function of the pancreatic liquid, according to Lehman, was first recognized by Valentin to consist in transforming into sugar such starch which may arrive in the duodenum in an unaltered condition. The discovery by Claude Bernard, that the pancreatic liquid is capable of decomposing neutral fats into fatty acids and glycerin, has been admitted by all subsequent investigators; but the availabilty of this property for the purpose of digestion, as asserted by Bernard, has been denied, Bidder and Schmidt among others proving that the decomposition of fats is prevented by the presence of acids and of the digestive fluids of the stomach. Dobell in 1868 found the pancreatic liquid of pigeons always to possess an acid reaction, and to have the power of emulsionizing lard, but not to decompose it. In most cases, however, and more particularly after feeding, the reaction of the pancreas is alkaline, and this condition, or the absolute absence of free acid, appears to be necessary to effect the decomposition of the neutral fats. Whether this is or is not an important function of the pancreas in the animal economy seems to be of minor importance for the question before this committee; but since pancreatic preparations have been recommended and used in medicine, it is important to know, whether or not the pancreatic liquid would lose its identity or remain unaltered when in contact with the digestive principles of the stomach, and this question appears to be decided by the experiments of Prof. Sheffer, proving that the presence of free mineral acid, or of pepsin and free acid not only *prevents* the action of the pancreatin, but that the latter is *destroyed*.

The committee deem this short criticism (made in a friendly spirit) as necessary to explain the conclusion to which they have arrived, viz., that the results attained to by the authors of these papers, have been foreshadowed by the investigations of previous writers to such an extent, that they do not, in the judgment of the committee *fairly* come within the provisions prescribed by Mr. Ebert in founding the "Ebert prize."

CHARLES BULLOCK,
W. H. PILE,
JOHN M. MAISCH.

PHILADELPHIA, March 17th, 1876.

DR. SQUIBB.—One word in regard to dilute phosphoric acid. I have noticed in my own experience, within the past two or three years, that this subject has been particularly interesting to us, that if the whole of the phosphorus, as required by the Pharmacopœia, be put into the flask with a small portion of the nitric acid and water at first, and the reaction started by heat, the remainder of the nitric acid being added through a funnel, little by little, all danger is averted and the process progresses steadily; the point being to add the nitric acid little by little, leaving the whole of the phosphorus in the bottom of the flask.

The Committee on Maximum Doses reported as follows:

September 12th, 1876.

TO THE AMERICAN PHARMACEUTICAL ASSOCIATION.

Your committee was appointed to confer with the American Medical Association, and to suggest to that body the growing necessity and value of a list, selected by medical practitioners, of the more powerful and dangerous preparations employed by them, giving their maximum doses, and to urge upon them the importance of employing a well-defined caution-mark, prefixed to all such preparations when prescribed in doses exceeding the maximum quantity thus laid down.

In carrying out this suggestion, the annexed communication was presented to the American Medical Association at their last meeting, which was held at Philadelphia in May last, and which we were informed by the Secretary of that body, Dr. Atkinson, of Philadelphia, was favorably noticed, and a committee of three of their number appointed to confer as soon as practicable with us. This committee has not yet acted upon the subject, but will no doubt do so shortly. We presume, however, their action in the premises will be referred back to the Medical Association at a subsequent meeting, before a final resolution can be reached.

W. H. PILE,
CHARLES L. EBERLE,
LOUIS DOHME,
Committee.

PHILADELPHIA, March, 1876.

TO THE AMERICAN MEDICAL ASSOCIATION.

At a meeting of the American Pharmaceutical Association, held in Boston September 9th, 1875, a committee, whose names are annexed, was appointed to confer with the American Medical Association, and to suggest to that body the advantage which would result by their selecting a list of dangerously active medical preparations, noting their maximum doses and the maximum quantity which may be administered safely during twenty-four hours, and which quantity should not be exceeded in prescriptions without the addition of some caution-mark by the physician. It should also be understood that where a prescription is presented to be compounded, with quantities exceeding the maximum doses thus laid down, and without the proper caution-mark, the pharmacist should return the prescription, calling attention to the omission, in order that the requisite mark should be properly affixed. It is believed by us, pharmacists, that this plan faithfully carried out would prove of practical value to all parties, by diminishing the liabilities to error which might otherwise occur.

Of course it is not intended in any way to indicate the limit to which the physician may prescribe any remedial agent, however powerful, yet what pharmacist but would acknowledge that he would feel greatly relieved if excessive or unusual doses of potent medicines were marked in some definite way by the physician, indicating that they were thus intended to be administered.

For the double purpose then of guarding in some degree the safety of the patient and at the same time relieving the pharmacist of an unpleasant responsibility, we earnestly request the American Medical Association, in any way it may judge most expedient, to submit this subject to the careful consideration and action of their body, believing as we do that it belongs to the medical profession rather than to the pharmacist so to act.

Very respectfully,
W. H. PILE,
LOUIS DOHME,
CHARLES L. EBERLE,
Committee.

The Secretary read the following letter, referring to the same subject.

PHILADELPHIA, September 13th, 1876.

JOHN M. MAISCH, ESQ., ETC.,
Permanent Secretary Amer. Pharm. Assoc.

DEAR SIR: The communication from your body, presented by Dr. Pile at our recent session, was acted upon by the appointment of a committee consisting of Drs. Alfred Stillé, J. B. Biddle, and Robert E. Rogers.

I regret to inform you that Dr. Alfred Stillé declines to act.

With high regard, I am your obedient servant,

WILLIAM B. ATKINSON,
Permanent Secretary Amer. Medical Association.

On motion of Dr. Squibb, the report of the Committee on Maximum Doses was accepted and adopted, and the committee continued.

The following report of the Committee on the Liebig Memorial was read:

TO THE AMERICAN PHARMACEUTICAL ASSOCIATION:

The undersigned, Committee on the Liebig Memorial, respectfully report that the small amount of money collected at last year's meeting, as a contribution towards the "memorial," is still in the hands of the chairman of your committee. That the chairman of your committee, who asked the chairman of the central committee of the American Chemists for information if he accept any further contributions, or if the list of contributions be closed, since it was known that the erection of the two monuments be in progress, has not received any answer by said chairman. It appearing that no further contribution towards the memorial be required and accepted, your committee requests the Association to decide on the proper disposition of the amount collected.

PAUL BALLUFF, *Chairman*,
Committee on Liebig Memorial.

PHILADELPHIA, PA., Sept. 12th, 1876.

MR. MENNINGER.—I move that the contributions be returned to the contributors, and the committee discharged. The awards for both memorials have been made, and the commissioners have announced in the German journals that they not only need no more funds, but have a surplus. It would seem absurd for us to continue the committee under the circumstances.

Mr. Menninger's motion was agreed to.

The Secretary read the report of the Committee on Legislation, which was accepted and referred for publication (see page 429).

MR. DIEHL.—I desire to draw attention to the fact that the pharmacy law of Kentucky has been modified by our last legislature.* There seemed to be a decided opposition to the fact that physicians were not eligible to practice pharmacy. This opposition on the part of certain physicians has caused a

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* The Committee on Legislation has not received a copy of this law in time for publication.—EDITOR.

change in the pharmacy law as applied to cities of five thousand inhabitants, and it has been amended essentially in this. The re-registration fee has been cancelled as no longer necessary, and the registration fee has been increased to $10 from $5. A clause has been inserted which states that nothing in the act shall apply to practicing physicians. How far that will enable physicians to open drug stores I do not know. We consider a physician opening a drug store and not practicing medicine as no longer a practicing physician, and so he comes under the province of the act, and our State Board of Pharmacy intend to carry it out in that way.

The committee was, on motion, empowered to incorporate into their report all changes of pharmacy laws which may be received in due time.

Dr. Hoffmann read the report of the Committee on Metrical Weights and Measures, and Mr. Wiegand a supplementary report, which were, on motion, accepted and referred for publication in the Proceedings (see page 423).

Dr. Squibb.—I move that so much of the report of the committee be adopted as regards the formation of a permanent committee, and that the whole subject be referred to a committee, that committee to be appointed by the President of this Association.

The Secretary.—A printed report from the Boston Society of Civil Engineers was sent some time ago to the Permanent Secretary with the request to lay it before the American Pharmaceutical Association. The report consists of arguments in favor of the metric measures, and a copy of the petition sent to Congress. The various arguments, I understand, are embodied and have been noticed in the report of the committee.

Dr. Squibb.—I beg to offer one word in advocacy of it. The conclusions arrived at by this committee are too long and too important for this Association to take them up *seriatim*. The Association could not very well adopt them as a whole. There is a good deal of discrepancy of opinion on this subject, and on the expediency of memorializing Congress. Those who are most familiar with the subject know that there are two very strong opponents in Washington, Professors Henry and Pierce, one at the head of the Smithsonian Institute, and the other at the head of the United States Coast Survey. Both are very influential, and use all their influence to divert and defer action on this subject. The chairman of the House of Representatives committee is a man whose interests are not at all enlisted in the metrical system. He was put there at the last session because there was no other place for him. The place he wanted he could not get. Mr. Kasson, who has done more work in regard to this subject than almost any other member, has been unfortunately left off of that committee, or been on it in a subordinate capacity for a year or two past. Therefore the reasons for my motion that this subject be recommitted to a new committee, or the old committee if the President chooses to appoint them—and it is a very good committee—with instructions that they report at the next meeting.

Mr. Sharples.—The committee, in making this report, have given the subject a great deal of attention, and have examined the objections. Prof. Pierce's objection I am better acquainted with probably than any one present. When the subject came up before the American Academy, instead of going at it in a scientific way, he made a violent personal attack on the movers of the resolution, and treated it as a personal matter in which he was interested more than anybody else. His course was not from any objection to the metrical system as a system, but arose from mathematical grounds in which no one except mathematicians have any interest. Overlooking altogether that we have a decimal currency that we use continually and find no trouble with, he brought up the old argument which has been met so many times, "that we could not divide a decimal system by two continually." You cannot divide any other system by two continually, no matter what system you take. The mathematician adopts a system in which sixteen is made to correspond to ten of the decimal system. It is a sixteen system that can be divided by two somewhat further than the decimal system. It makes no difference if we start with a small number as a unit, and use multiples and increase it, or start with a larger number and divide it, we come to a unit some time that is indivisible, except by fractions. In reference to the subdivisions of measure, I may say that no one I know of using them (and I myself have been in constant use of them for ten years, and no other system is used in any school of chemistry in this country) bothers himself with the names of the subdivisions; generally, the litre or the tenth of a litre is used. We never use the decalitre or centimetre. The cubic centimetre in the laboratory is the unit of measure, and we speak of one hundred, five hundred, or a thousand cubic centimetres, and do not use the term millilitres. We use the millimetre as the unit in the physical laboratory, and speak of ten, one hundred, or one thousand, and do not bother ourselves with the subdivisions. We do the same thing in our old system; we speak of a quarter of a pound; we do not speak of four ounces. It is a quarter of a pound or an eighth of a pound; or we use the ounce as a unit, and speak of multiples and divisions of that; and, as a general thing, we always use one measure as a unit, and do not use the French terms for expression of its divisions or multiples. I am not in favor of the compulsory adoption of this measure. I think the compulsory adoption will only hinder it; but I am in favor, and that most thoroughly, of educating the people up to its use, and showing in every way how much more convenient and handy it is than the old system. As an instance of that, I will mention a change that I have made in certain reports within a few years. Formerly, in analyzing water, I always reported the number of grains of solid matter in a gallon. Now I merely report the number of parts in one hundred thousand. That is one step in that direction. Now, there are many steps of that kind that can be readily used. The parts in one hundred thousand is just as definite information for the majority of people as the grains in a gallon. In the first place, they do not know how many grains there are in a gallon. If the question was asked here to-day how many grains are contained in a United States gallon, we should most likely have two or three different answers. One part would say that we have 70,000 in a United States gallon, but the United States gallon never did contain 70,000. That is the imperial gallon. The imperial gallon never has been adopted as a standard in this country, yet I often see reports made in that gallon. Then, again, another party will say that the United States gallon contains 58,372 grains, and quite a large number believe that it does. That has been reported as the number contained in it. If we look at the Dispensatory we will find that it contains 58,328 grains. That is adopted by quite a number. Prof. Joseph Henry says 58,317 grains, and I am sure I do not know how much it does contain. So, for that reason, I have dropped that altogether, and merely use the parts in hundred thousands, that is, milligrams in the tenth of a litre of water. Now, this decimal system we use in every other transaction of life, and why not extend it one step further to our weights and measures? The interchangeability of these weights and measures, as Mr. Wiegand has truly remarked, is a matter of no earthly importance to anybody but the scientific man. It is a decimal system that is wanted, mostly and mainly for international reasons. There is no reason for adopting the metre rather than the pound and foot as our basis of subdivision, but for international reasons, for convenience all over the world, so that a man living in Japan, for instance, can readily understand what we are talking of in this country. The decimal divisions of a pound or foot would be just as convenient to us. The decimal divisions of a foot have been thoroughly and entirely adopted by all the engineers in this country. They never say an inch, but they say a foot and its decimals.

The motion of Dr. Squibb, to refer the report to a committee for further report at the next meeting, was adopted.

Mr. Bedford read the report of the Committee on Photographic Album (which report was not received by the Secretary), giving an account of the collection of photographs during the past year, and recommending to rescind the resolution of 1872, by which the Permanent Secretary was made the custodian of the albums, and to place them in charge of the Special Committee.

Mr. Bedford.—In explanation of this recommendation, I will state that the original rule adopted by the Association was that the album should be in the charge of Professor Maisch, Procter, and Parrish.* Two of these gentlemen are deceased, and in order to keep the volumes in proper order the chairman of the committee must have them in his possession.

Dr. Squibb.—I move the acceptance and adoption of the report which carries with it the recommendation.

Mr. Menninger.—I second the motion, and offer an amendment to the resolution: that the report be accepted, that the committee be discharged, that the album be handed to the Permanent Secretary of the Association for filing in his archives, and that further labor in that direction be discontinued. I would offer, in support of that amendment, that at the time this proposition was made the Association was much smaller than it is now. The labors of

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* See Proceedings, 1872, pp. 56 and 95.—Editor.

the committee have been up-hill work, and but very few photographs have been obtained in proportion to the number of members. There seems to be no definite object in the collection of these photographs. Gentlemen who desire to be immortalized through this Association had better take up our list of queries than hand in a well-executed photograph of themselves. I think the committee has outlived its usefulness.

The motion of Dr. Squibb, as amended by Dr. Menninger, was carried.

Mr. Calder, chairman of the Special Committee on Letter from the Tennessee College of Pharmacy, read the following report, which was, on motion, accepted:

The committee to whom was referred, at the last annual meeting, the matter of the letter of Mr. B. Lillard, Treasurer and acting Secretary of the Tennessee College of Pharmacy, would respectfuly report that in pursuance of the duty assigned them they, through their chairman, addressed a letter to the registrar of the Tennessee College of Pharmacy, making inquiries relative to the official character of the letter, and also as to the custom, past and present, of the college in matters pertaining to the graduation of students, to which they received the annexed letter in reply, as follows:

TENNESSEE COLLEGE OF PHARMACY,
REGISTRAR'S OFFICE, NASHVILLE, Aug. 19th, 1876.

ALBERT L. CALDER, ESQ., *Chairman.*

DEAR SIR: Your favor of 14th instant duly at hand. In reply to the inquiries of your committee I would say:

1. The custom of the Tennessee College of Pharmacy, past and present, is to graduate only such persons as have been matriculates during two sessions, and have, on the conclusion of their second course, passed a satisfactory examination on the subjects of instruction.

2. Previous attendance on one session in any other pharmacal college is recognized as an equivalent to the first session's attendance here.

3. Students are expected to attend at least a majority of the lectures. This rule has been relaxed in two or three instances, in the case of druggists of long experience and recognized ability.

4. The college has never, in any instance, granted or *proposed* to grant any title or degree without a thorough examination of the candidate. A purely honorary degree would, of course, not come within this rule, but so far no such degree has been conferred.

5. Dr. Lillard, as acting Secretary of the college, was, of course, authorized to communicate these rules to applicants for matriculation. Any or all letters addressed by him to such applicants, which convey no offers contrary to the usages of the college as set forth above, are recognized as proper official acts.

Please acknowledge receipt of this communication, and oblige,

Your obedient servant, etc.,

JOHN H. SNIVELY,
Registrar

To a second letter to the same, asking his opinion and interpretation of "the letter," the reply letter was received, which is as follows:

TENNESSEE COLLEGE OF PHARMACY,
REGISTRAR'S OFFICE, NASHVILLE, Sept. 4th, 1876.
A. L. CALDER, ESQ., *Chairman.*

DEAR SIR: Your favor of 31st August reached me this morning. In reply I would say that Dr. Lillard was probably careless in the use of language, and has thereby, perhaps, laid himself liable to misconstruction. Students are usually allowed to take out tickets "as they desire;" that is, prepayment is not insisted on, but the fees are accepted in instalments during the session. Tickets are not sold, however, during a given session for the session or sessions that are to follow it, and, as they are furnished annually by the professors, any attempt to after-date them would require the connivance of the whole faculty. Dr. Lillard evidently intended to convey the idea that the applicant could procure tickets at intervals during the session *for that session*, and, having been a matriculate during a second session, and procured tickets in like manner, he could then become a candidate for graduation. This seems to me a fair construction of "the letter." *The college certainly never offered graduation to one-session students*, and as Dr. Lillard could not have carried out such an idea unaided by the faculty, I can see no reason for his offering to do it. If he did make such an offer, the fault lies with him personally. I am unable to discover that he did, but if his letters have been so worded as to give room for such an interpretation, the case lies between him and those who assume the right of inquiry into the matter. I can only repeat that neither he nor any one else has ever been authorized by the college to make any offer to students which were not in accordance with the rules and customs as given in my last communication to you.

I may be allowed to remark that I am afraid personal feeling has had a great deal to do with this attack on Dr. Lillard and the Tennessee College. The gentlemen of the "Convention of Teaching Colleges" have, perhaps, some reason to dislike Lillard from the position of his "Pharmacal Gazette" on the question of title, etc., and they have thus endeavored to make a mountain out of a very small mole-hill. I hope your committee will give this due consideration in making your report.

I inclose you, as requested, a copy of our last announcement and of our constitution. The latter is a copy of that instrument as first adopted. It has since undergone some changes, but remains substantially as before.

I am sorry to say that I shall not be able to meet you in Philadelphia at the approaching session.

As I am afraid this may not reach you in time, I would be glad to have an acknowledgment at once. Failing to hear, I will conclude I have missed you, and will try to reach you at Philadelphia.

Very truly yours,
JOHN H. SNIVELY,
Registrar.

And further, at the request of Mr. Lillard, they, through their chairman, had a personal interview with him at his residence in Boston, at which he gave a verbal explanation of the letter under investigation, in substance as follows: That he had no distinct recollection of this particular letter or of the person to whom it was addressed, but it was similar in character to several written at about that time in reply to letters received from graduates of other pharmaceutical colleges, who applied for information relative to the course of study necessary to be pursued to obtain the degree of Doctor of Pharmacy conferred by this college, and the custom and practice of the college in conferring it. That it was so written, he evidences by the blank referred to in the letter, and which does not appear to have been before presented to the Association, and which is in part explanatory of the letter, from the fact that it makes inquiry relative to the number of sessions previously attended at college of pharmacy, and where. And all this letter was intended to say was, that if the applicant was a graduate of some other college he could, after matriculating and taking out tickets for two sessions, the second of which could not be obtained until after the first had been attended, he could then become a candidate for graduation, which graduation could only be obtained after a satisfactory examination in all branches taught by the college, and had also complied with the usual conditions named in their published announcement.

And your committee, accepting the written statements of the Tennessee College of Pharmacy as fact, are of opinion that that college has not departed from an honorable course in tendering or conferring its degrees.

A. L. CALDER,
Chairman.

MR. LILLARD.—I should like to make a few remarks as a personal explanation of my action in this matter. In commencing I would state that the Tennessee College of Pharmacy was organized and incorporated in 1871, and that its professors and trustees are, with one or two exceptions, men of ability, learning, and long experience as professors in universities and colleges in that vicinity. I would also state that the question of degrees and titles was considered one of the most important at the time of the adoption of its constitution, and received a great deal of attention at a number of meetings of the trustees. After thoroughly considering the matter in all its aspects, and with a due regard for the practice of other colleges, thinking that it was nothing more than right that graduates of pharmacy, having gone through all the requirements, should receive a regular degree, and not the title of Graduate in Pharmacy, as is offered by the colleges represented in the convention of teaching colleges, the trustees voted to confer the degree of Doctor in Pharmacy. When that announcement was made in the prospectus of the college, we received many inquiries from parties all over the country. These inquiries were of two kinds: one kind was from parties who had no or but a short experience in the business, and they wanted to know about getting situations to help pay their expenses while attending the lectures. The other class of inquiries was from parties representing themselves to be graduates in pharmacy. We adopted, at first, a regular system of replies to these inquiries. To the first inquiries, as a general rule, we only sent the announcement, or prospectus of the college, which gave in a majority of cases all the information desired. To the second class of inquiries we wrote letters similar to the letter addressed to Mr. Patterson, which was presented at our last meeting. Now, I propose to explain that letter to this meeting in such a manner that I think there will be no possible doubt in the mind of any one that that letter was intended as a reply to a response of that kind.

MR. SAUNDERS.—I would like to ask Mr. Lillard as to how long this report he proposes to read will take, because we are all anxious to hear Dr. Squibb's paper, and perhaps it will be better to defer the reading of the document, if it is lengthy, until the close of the session.

MR. MENNINGER.—The paper will have to come in under the head of volunteer papers. The subject has been reported upon by a committee and the college fully exonerated.

DR. SQUIBB.—The committee was appointed, so far as I understand, to save the Association from a lengthy consideration of this affair. That committee has taken the necessary steps and reported, and we have accepted that committee's report, and have no motion for its adoption. The gentleman is speaking on personal privilege, and the question is, shall that personal privilege be accorded before the question of the adoption of the report comes up, and if so, the Chairman of the Business Committee asks how long a time he desires? I think that is courtesy to the gentleman, and also to the Association, whose time is very much limited.

MR. BABCOCK.—It seems to me it may be a question whether or not this report is to be adopted or referred back for some further addition. The gentleman who now has the floor is about to make a personal explanation. Perhaps the result of the explanation which he is to make may render a reference of the report back to the committee necessary, and when the statement is made that the time of this Association is valuable, and therefore he ought not to be allowed to make his defence to charges of the most serious character which have been circulated all over the country for twelve months, I beg to remind the gentleman that this matter was deemed of sufficient importance last year on the heels of the Association, to take up more than two hours of time in the discussion and the bringing forward of charges against Mr. Lillard, the result of which was that nine papers, if I recollect right, were read by title and printed in the Proceedings without opportunity being given for discussion upon them. This charge against Mr. Lillard is of having offered to sell diplomas. It is a capital charge, and would submit him to pharmaceutical decapitation if proven. It seems to me unjust that now, while this report is fresh in the minds of gentlemen present, he should not be allowed to make his full and complete vindication of himself as he desires, and I hope he will be allowed to go on.

MR. MENNINGER.—I asked that this paper be deferred, that we may go on with the more legitimate business, but if the gentleman of the Tennessee College insists upon having this matter discussed it will take more time than it took last year. The gentleman has been exonerated. There is no longer a stigma resting upon him, for a committee of this Association, having duly investigated it, fully exonerate the college.

The President.—The Chair understands that Mr. Lillard has arisen upon a question of privilege. It remains for you to say whether you will hear him now.

Mr. Lillard.—The committee did not exonerate me. I expect I shall have to leave the city to-day, and this will be my only opportunity to be heard. I think it is nothing but justice to me that I should be allowed to make this statement here, and if anybody has anything to say to the contrary, let them say it now.

Mr. Eberle.—I move that the gentleman be allowed to proceed.

Dr. Squibb.—Without any regard to the time; if he takes the whole time of the Association, if he needs it.

Mr. Lillard.—I shall take but very little time.

Mr. Babcock.—I desire to call for the yeas and nays on that question, whether or not Mr. Lillard be allowed to proceed. I want the members to put their names on the record, whether they are willing that a gentleman should have these charges preferred against him and printed in the Proceedings. I will withdraw the motion if the gentleman is accorded the privilege; there is a personal matter which ought not to be brought into the Association.

Mr. Menninger.—I move that the motion to call the roll be laid on the table.

The President.—The motion has not been seconded.

Mr. Hancock.—The gentleman withdrew his motion for the call for the yeas and nays.

Mr. Babcock.—I withdrew it because the gentleman seemed disposed to accord to Mr. Lillard the privilege. I desire to save all the time that is possible. I desire to see justice done, and if I can secure it, I mean to secure it.

Mr. Saunders.—My request was simply asking Mr. Lillard to say how long the explanation was going to take him, not with any view to suppress him. Before I can intelligently vote, I should like to know whether he will take ten minutes or half an hour.

Mr. Kennedy.—Mr. Lillard states that if he had not been interrupted he would now have been through.

Mr. Sheppard.—Mr. Lillard has a child at home very sick. He had a telegram yesterday desiring him to return immediately. He telegraphed requesting to stay until this matter come up. He may be called home at any minute, probably to his child's death.

Mr. Lillard.—I will now commence with this letter to Mr. Patterson, and explain it as I go along. The first paragraph of the letter does not have any connection with the question at issue, and needs no explanation at all. The second part begins, "I also send you blank to be filled out and returned, if you wish to matriculate." I have a copy of that blank, as certified to by the Secretary. It was unfortunately omitted at the last meeting. As stated in the report of that committee, that blank states (it was written out especially for this purpose), "How many sessions have you attended in a college of pharmacy, and where?" That means that we wanted to know, before this man could matriculate under these circumstances, where he had attended a college of pharmacy, and how much. I would also state that I inclosed in all communications of this kind a copy of the constitution of the college and a blank prospectus. This I did not mention in the letter, and as they were not produced at the meeting last year I suppose they were also overlooked. I will read one clause of the constitution as adopted in 1873. Section VI, Article VIII: "The degree of Doctor in Pharmacy may be conferred on all graduates in pharmacy, who have been in a pharmacy or retail drug business seven years; and who have secured certificates of attendance from the professors of Botany and Analytical Chemistry, and whose standing shall have averaged seventy-five or more in all the branches taught in this college. Candidates for this degree shall present to the Dean of the Faculty, on or before the first of February, the certificates of the professors of Botany and Analytical Chemistry, and the graduation fee."

Now that throws some additional light on that part of the letter which says: "You could matriculate now, without being present, and could then take out your tickets as you desire and attend whenever you may."

The College of Pharmacy does not require graduates of pharmacy to re-attend the lectures on the three branches that are taught in other colleges. It takes it for granted that a graduate must know something about them; but it requires a re-examination, and, if I am not mistaken, they must have a higher degree of qualification than is required in some of the other colleges. The only lectures that candidates of this kind were required to attend were on analytical chemistry and practical botany. Since then another chair has been added, that of Practical Microscopy. Now, in all three of these branches, instruction is given privately to each student in such manner and at such times, whether there is a session of the college in operation or not, as may suit the convenience of the student and professor. With a knowledge of these facts it appears very plain and very simple why I should have written him that he could take out his tickets as he desired, and attend whenever he could. It has been the custom of the college to give private instruction to each individual at any time and under any circumstances the professor and student might arrange. After getting tickets for two sessions he was required to take out the tickets on the other three branches, but there was no pay for that. Another clause of the constitution says: "Graduates of all colleges of pharmacy, and students who have paid for two full courses, are admitted to the lectures free." So he would take out tickets, but not be required to pay anything. After getting tickets for two sessions, which would include two winters, he could come up for graduation the same as if he had attended all the lectures; that is, if he had attended all the lectures on materia medica, chemistry, and pharmacy, because he had already attended them.

This coming up for graduation, this making his application for graduation, refers to the custom of the college of registering them as candidates for degrees when they have complied with the requirements. The constitution says what shall be required of these candidates. They are to be examined. It says: "Reports of all candidates examined are to be made and graded as they actually occur from the professors' report. Ten written questions, ten specimens to recognize, and ten oral questions, shall be required of all, and the percentage of correct answers shall be shown in hundredths; an average of sixty being required to pass as satisfactory, and ninety as very satisfactory."

With this explanation I do not see how it is possible for any one to doubt but that this letter was intended for a person who had made application of this kind.

Mr. Menninger.—Will you read the original letter?

Mr. Lillard read the letter (see Proceedings, 1875, p. 832), after which Mr. Shinn moved the adoption of the committee's report. At the request of Dr. Squibb, the conclusion of the report was again read by the Secretary, and the report was then adopted.

Mr. Menninger.—I now move that the advertisement of the Tennessee College of Pharmacy, as read in the explanation of the gentleman implicated, be omitted from the report of the Association. I make this motion for this reason: I do not want to bring up the propriety of peddling titles through this country. I mean no personal offence to the gentleman in using that term. There has been a tendency on the part of scientific men in different countries for the past decade to establish uniform standards, not only of education, but of titles. Now their title, which is an innovation, conveys something entirely different from what it does in European countries, and therefore I propose that this Association shall not advertise their project by publishing the advertisement in the Proceedings, that they will confer the title of Doctor in Pharmacy upon graduates of other colleges; in other words, that a man may go to their college, and do the same as he would in other colleges, but receive a supposed higher title.

Mr. Calder.—How does the gentleman propose to alter the report?

Mr. Menninger.—I do not propose to alter the report, but that merely the personal explanation of the gentleman be printed, without the advertisement of the Tennessee College.

Mr. Lillard.—I would like the gentleman to specify what he means, and also if he means that the verbatim report referring to this is to be left out. I think, if we are to have a report of the Proceedings of the Association, that it is nothing but proper that we report *all* the proceedings of the Association, as nearly as we can, in exactly the way that they occur. So far as the advertisement of the Tennessee College of Pharmacy is concerned (with which I now have no connection whatever, and had none at the time this thing was brought into the Association last year), as a matter of justice and fairness, I think it should be published. The Tennessee College of Pharmacy did not bring up this advertisement; they did not bring it before the convention of teaching colleges, nor order them to bring it here. They did not in any way desire or care for any such advertisement. No one got up last year and said we had better not put that in the Proceedings until we find out more about it, and I think it is no more than right and justice to all parties to report it in full; and it would be establishing a precedent we might not want to have come up in the future. Let us give everybody justice, as near as we can, and let the whole report of this meeting, on this and all other questions, be printed as near as it can be in full as a matter of history and justice to all parties concerned.

Dr. Squibb.—I agree with the last speaker, in the fact that any proceedings of this Association must be published in its Proceedings, in justice to the Association, not to the speaker. If there have been statements made here they must go as other statements that are made here. We cannot refuse an advertisement, if it comes before us in a proper way, even if it be an improper advertisement. We must report our proceedings; there is no way out of it. We all know that this matter has taken up a good deal of our time. A good many are evidently a little impatient at it, but, in my judgment, there is no reason why it should not go on the proceedings and be spread on the record. Therefore I am opposed to the motion of Mr. Menninger. I mean to be as entirely fair as I can be. In this country these things are left at loose ends, and they must be allowed to take their own level. If the Tennessee College chooses to confer the title of Saint on anybody they have a perfect right to do so, but the question with us is whether we shall receive the delegates of the college, and that is the only question before this Association. Is our Association with them, or theirs with us? We may resign from our connection with them, or they from us. One or the other must be done to bring this matter in this Association to an end. We must fail to agree with them in their views of carrying out pharmaceutical education, and in order to do that we have no means at all except to refuse to accept their credentials. We have not done that. We do not propose to do it. And now this report clears the matter up, allowing it to stand on its own basis. I do not fear that anything that has been said may appear in the publication. I have no hesitation in saying that they will not discredit the Association; if they do not discredit anybody in connection with it, so much the better.

Mr. Menninger.—I will withdraw my motion.

Mr. Babcock.—I understand the report of the committee has now been adopted. I wish to offer a motion which is germain to this subject. As the gentlemen will observe, the report entirely exonerates the Tennessee College, but makes no mention directly and specifically of Mr. Lillard's connection with the affair, as being one of an honorable character, and because that omission is made by the committee, and to avoid taking up too much time by sending it back, although the Association has voted to adopt it, I offer this preamble and resolution:

Whereas, The charges against Mr. Lillard have not been sustained, therefore

Resolved, That this Association declare Mr. Lillard is entitled to the same degree of confidence that is accorded to any member of this Association.

I am not particular about this precise phraseology. I drew this hurriedly, but my idea is to present a motion and have it put on the record which shall exonerate him. He has rights as a member of this Association, and it is right and proper he should be exonerated as well as the Tennessee College of Pharmacy.

The President.—There has been nothing here which has transpired in this Association to lay any charges against Mr. Lillard personally.

Mr. Babcock.—I am happy to hear that announcement, but I wish to say one other thing, and that is this: I wish to read a copy of the blank which formed a part of the original letter of Mr. Lillard, and have that incorporated in the Proceedings, because that blank was a part of the letter and was omitted.

The President.—The Chair decides it out of order. The question opens the matter of the report of the committee.

Mr. Babcock.—I present a motion. I am in order, I suppose, in doing that?

Mr. Eberle.—To my mind, the resolution is out of order. The Chair has stated what I would have remarked. We have nothing to do with Mr. Lillard as an individual, and his record before the Association stands just as it always did. Last year the point was raised at Boston, that he, as an officer of the college, had made a communication which was thought to be contrary to the feeling of the Association in regard to matters of propriety. He was not recognized at Boston as an individual, but only as an officer of the college, and there was no attack made on him in any way; on the contrary, a committee was appointed to take into account the supposed connection of the Tennessee College with the case, and it was understood that if they would not explain, then Mr. Lillard could be dealt with as an individual; but he is not in that position to-day.

Mr. Babcock.—It will not take but a moment to pass it, and that settles it.

Mr. Bedford.—There are no charges against Mr. Lillard, so there is nothing to vote upon.

Dr. Squibb.—We can vote upon any resolution, when it is presented, whether there are charges or not. We have only to vote upon the charges, according to our consciences, yea or nay.

Mr. Wiegand.—I move to amend, by making it read that Mr. Lillard has the same status he ever had.

Mr. Menninger.—I hope the resolution will not prevail. In the first place, there have been no charges against the gentleman individually; in the next place, neither the report of the committee nor the gentleman's explanation has, to me, satisfactorily explained the last sentence of his letter. I am willing to vote here that his status is as it was before, but I am not willing to gloss over or whitewash a thing which has a very dark spot upon it.

Mr. Judge.—I move to indefinitely postpone the whole subject. The statement is positively made that there are no charges against him.

Mr. Babcock.—I withdraw the motion, because gentlemen have stated here, on this floor, and it is now a part of the record, that there are no charges against Mr. Lillard.

A Member.—I move that the vote by which this report was adopted be reconsidered, in order that it may be amended by inserting, the action of the college or any officer thereof.

Mr. Luhn.—We were not instructed to inquire into the personal character of Mr. Lillard, but only the status of the Tennessee College, whether they were guilty or not, and we have studiously avoided all personalities in the matter.

Mr. Wharton.—I have only a few words to say. As a delegate from that college, being also a member of this Association, I simply rise to say I think the Tennessee College of Pharmacy will be amply satisfied with the report as it has been handed in by the committee, and that no other action at this time will be considered of advantage or of service to that college.

Mr. Babcock's motion having been withdrawn, the matter was dropped, and the report of the Committee on Julius Fehr's Complaints called up. It was read by Mr. Eberle, as follows:

The committee to whom was referred the complaints of Julius Fehr would respectfully report, that Mr. Fehr, in response to a letter to the chairman of the committee, made known his complaints as follows:

First. That the Committee on Specimens neglected in their report to mention an article which he exhibited at the meeting of the Association held in Louisville, Ky.

Second. That some remarks made by him before the Association had not been printed in the Proceedings.

Third. That the Committee on Papers and Queries omitted to present to the Association during its sessions, or to have published, a volunteer paper, which was handed by him to the committee.

In investigating these complaints, the chairman of this committee has corresponded with the chairman of the Committee on Specimens for the year 1874, and conferred with other members of the Association, and is informed that no articles which were *proprietary*, nor any patented articles, were mentioned in their report; and in this respect Mr. Fehr does not stand alone, as several other exhibitors are not mentioned, owing to the character of their exhibits.

The second complaint is directed against the Secretary of this Association, and practically charges him with neglect to publish Mr. Fehr's remarks, made at one of the sessions. To this charge we find that all discussions or remarks made at the meeting were taken in shorthand by our able stenographer, Mr. Slade, and from him we learn that he was unable to understand what Mr. Fehr did say, and he could not possibly report it *verbatim*. A paragraph on page 566, of the Proceedings of 1874, gives a part of the substance of the remarks by Mr. Fehr. The report of all the discussions of the various sessions, as furnished by Mr. Slade, was published by the Secretary, and the committee find no remarks in that report which were not published.

The third complaint of Mr. Fehr is, that a volunteer paper presented by him was neither read at the meeting nor subsequently published. By inquiry your committee learn that a paper was presented to the Committee on Papers and Queries, and on examination they unanimously decided that it was neither suitable for publication nor of sufficient interest to the Association to warrant any action save that of declining it. Your committee find that neither of the committees are in fault, and that the omission from the printed minutes of the remarks which Mr. Fehr did make was no fault either of the secretary nor the stenographer.

Your committee do not think that Mr. Fehr has any just or reasonable cause of complaint. Each and every member of said committee was put in possession of *all* the papers, letters, etc., pertaining to this matter, and without previous consultation with any other member formed an unbiassed opinion upon the merits of the case, which opinion a subsequent comparison showed to be unanimous.

Your committee respectfully offer the following resolutions, viz.:

1st. *Resolved*, That the complaints of Julius Fehr against the Association be dismissed.

2d. *Resolved*, That no patented or proprietary article, or one the composition of which is held in the least degree in reserve, shall receive official notice at the hands of the various committees of this Association, without further action on its part.

WILLIAM NEERGARD, *Chairman*,
CHARLES L. EBERLE,
J. R. MERCEIN.

The report was accepted, after which Mr. Fehr handed to the President a communication, the reading of which Mr. Rice desired to be deferred to a subsequent session, so that the reading of papers might be proceeded with.

DR. SQUIBB.—That is another subject coming from a committee of this Association who have, so far as we know, fairly dealt with it in their report. I move that report be adopted. If the author of the communication on the desk has anything to say to this Association which he did not say to the committee in defence of himself, that was his fault and not the fault of the Association.

MR. SHEPPARD.—I would like to ask the committee who drew that series of resolutions, whether among patented articles they include any pharmaceutical apparatus which may at some future meeting be exhibited to us, and which has been patented.

MR. EBERLE.—There is a qualification to meet that; it says, "without further action of the Association." The resolution was brought to the committee by a gentleman, in order that this question might be set at rest forever. It will be entirely competent for the Committee on Exhibition to offer to the Association such articles of that nature as they may think desirable for us to take cognizance of. When they do so the Association gives its consent that the matter shall appear in their report, and that decides the status of the article.

An amendment was made, that Mr. Fehr be allowed to present anything to the Association in order to govern the members in their votes.

DR. SQUIBB.—Anything that is said now in the discussion of this matter must be reported by the stenographer, and published in the Proceedings. We got into that trouble before by not adopting the report of the committee without hearing discussions, and we also lost a great deal of time. My object is not to cut off anybody from his rights, but to refer those rights to the committee which the Association has appointed to hear it. If the committee have not heard all that can be said on the subject it is the gentleman's fault and not the committee's.

MR. EBERLE.—It is competent for the Association to refer it to a new committee.

A GENTLEMAN.—I am not a member of this Association, but if Mr. Fehr has not been understood I may be understood, and he has requested me to say a few words by my mouth instead of his. He wants to be heard. The impression here in this Association is that the committee have heard Mr. Fehr. They have not heard him at all. The correspondence shows he had not an interview with them.

MR. EBERLE.—I rise to a point of explanation.

MR. FEHR'S REPRESENTATIVE.—If you will leave this to me for five minutes you will find that he has a good cause of complaint. I am speaking for Mr. Fehr.

MR. EBERLE.—I rise to a direct explanation. Mr. Fehr has interviewed all the members personally, me as one of them.

MR. HASSENCAMP.—Has a gentleman a right to address the Association who is not a member?

Mr. Rice moved that the Committee on Papers and Queries be called upon to report; and Mr. Babcock offered a substitute that Mr. Fehr be allowed five minutes, which after some discussion prevailed. Mr. Fehr then read the following communication:

TO THE AMERICAN PHARMACEUTICAL ASSOCIATION.

MR. PRESIDENT: Herewith I respectfully submit the correspondence with the chairman of the Committee on Julius Fehr's Complaints, as documentary evidence that this committee did not investigate the case intrusted to them at all. Baffled and perplexed I stand when men of capacity, of integrity, highly esteemed, act in such a manner.

This, Mr. President, brings my case at once again before the Association. I will conclusively show that my acts were legitimate, and that the acts of those prominent members who endeavored to humble me so mercilessly were certainly illegal.

For years past the Committee on Specimens has encouraged manufacturers to exhibit, and has even promised them all facilities to dispose of their commodities. Besides this, I was specially invited by the local committee of Louisville.

I undertook to send there a large exhibit of my preparation, and went there myself; but was certainly disappointed when I found that the Committee on Specimens had ignored me. As documentary evidence of my exhibit I submit hereby a specimen of the same, and the three circulars which accompanied the same.

Secondly. I had occasion to speak at the last session of that meeting, and correct some erroneous and confused ideas entertained by prominent members. Those remarks of mine, although clear, positive, and decided, were omitted in the Proceedings. As documentary evidence of the same, I submit herewith these remarks in writing.

Thirdly. I had written a voluntary paper. This paper, although handed in by me in due time, was not brought before the meeting. As documentary evidence,* I submit herewith the same for your kind consideration.

JULIUS FEHR.

DR. SQUIBB. Here is a direct issue brought between the gentleman and the committee. He accuses the committee of unfairness in not having done what they report that they have done, and it is fair that the committee should be heard in the matter.

On motion of Mr. Sheppard, the committee was granted five minutes for reply.

MR. NEERGARD.—As chairman of the committee, I would say that we received from the Secretary all the books and papers, and found exactly as we communicated to the Association. We next applied to Mr. King, chairman of the Committee on Exhibition, and his answer was that Mr. Fehr's articles were not a proper exhibit; and from the Committee on Papers and Queries we learned that the paper offered by Mr. Fehr was not a proper one to bring forward.

MR. EBERLE.—I perhaps was too sweeping in my assertion that all the members of the committee had been interviewed by Mr. Fehr personally. I only speak for myself. I certainly was. Mr. Fehr came from Hoboken to Germantown, where I live, and interviewed me for a considerable time. I assured him his case would receive a very fair consideration, and that there was no prejudice in our minds. He seemed to be uncomfortable in that respect. He thought there was a strong prejudice in the Association against him, and I assured him he need give himself no uneasiness on that score; that the committee were dispassionate men, and would give the case a very fair and impartial consideration; and if there was any doubt by which he might obtain the advantage, we would give it to him in our report. The members of the committee—I can answer for myself and Mr. Mercein—looked over the whole correspondence in reference to it, and we also gave especial attention to the published matter in the "Pharmacal Gazette." A good deal of that was such as would probably raise, if it was produced and read in evidence before you, ire in your minds, and you might be led to feel a prejudice; but we have been led to feel that that was a matter of bad judgment on his part, and not a desire to place himself in a false position before

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* None of the documentary evidence referred to was handed in with the communication.—SECRETARY.

you. But certainly, in our judgment, the committee are to be sustained in the case of Mr. Fehr.

MR. BEDFORD.—If the members of the committee have not been interviewed, as much cannot be said of the members, many of whom, in New York, have been interviewed. I think the matter is beneath the dignity of the Association to further pursue. It has received full consideration, and if our committees are to be subjected to what might be called a persecution, what is the use of appointing committees? The matter should not receive one moment's further consideration.

MR. FEHR.—I can show that the remarks of the last speaker are entirely false.

DR. SQUIBB.—The gentleman has stated that the statement of the last speaker is entirely false; and on that statement I move his expulsion from the Association.

MR. BEDFORD.—I only rise to say that would please Mr. Fehr too well.

MR. FEHR.—No gentleman—

MR. ROBERTS.—I move that all further consideration of this matter be indefinitely postponed.

MR. SHEPPARD.—I hope the amendment, as offered by Mr. Roberts, will not prevail, because it sets a precedent allowing—

MR. ROBERTS.—The question is not debatable.

MR. SHEPPARD.—I hope the motion of Dr. Squibb will prevail.

Mr. Fehr's representative again attempted to speak, but was interrupted, and the motion of Dr. Squibb was then formulated thus: That Mr. Fehr be expelled for disrespect towards committees and officers of the Association, and for indecorous language towards a member.

Mr. Royce offered an amendment, that Mr. Fehr be permitted to apologize.

DR. SQUIBB.—I do not desire by my motion to cut off any debate on this question of expulsion, and I am aware there are several sides to all such serious undertakings as the expulsion of a member. If the gentleman under the proposition to expel him from this Association, wants to make any explanation or apology, that comes after the fact of the offence, and although the apology may be accepted, it does not, in my judgment, stand in the way of the action of this society for preventing the occurrence again. If this gentleman be allowed to explain and take up the time, and then end with an apology, we shall be subjected to this thing over and over again. The scurrilous language which is used towards the officers and committees of this Association, make it a point of necessity for this Association to protect itself against such action in the future.

To a question from Mr. Hassencamp as to the nature of Mr.

Fehr's remarks, Dr. Squibb again briefly reviewed his language towards the committee and Mr. Bedford.

Mr. Hancock.—I hope the resolution of Dr. Squibb will be adopted by this Association. The gentleman has made an unreasonable request of this Association. He has been insolent and offensive to members of this Association because they would not grant an unreasonable and unconstitutional privilege. I hope we shall maintain our dignity by expelling the member from the Association.

Mr. Babcock.—I rise to a point of order. The motion of Dr. Squibb was amended. The amendment is to allow Mr. Fehr to apologize.

The President.—As that is carrying the motion away from its original intent, and as we have no request from Mr. Fehr to be allowed to apologize, the chair decides that it is not in order.

Mr. Babcock moved that Dr. Squibb's motion of expulsion be referred to a committee; but this not being seconded, read Article II Chapter IX of the By-Laws, and moved to lay Dr. Squibb's motion on the table. The motion was lost, and the question recurring on the original motion, offered by Dr. Squibb, it was carried by a vote of 106 yeas against 19 nays; Mr. Tufts counting the votes. A call for the yeas and nays was made too late, and Mr. Fehr was declared to be expelled from membership in the Association.

A motion made by Mr. Mattison to adjourn till three o'clock was lost.

Mr. Eberle moved that a competent person be selected to whom all papers can be referred for reading in case the author is not present; but withdrew the motion after some explanation.

An invitation was received through Mr. McIntyre for visiting the glass-works of Messrs. H. C. Fox & Co., and on motion, accepted with thanks.

By invitation of the Committee on Papers and Queries, Dr. Squibb read a voluntary paper on the Administration of Phosphorus (see page 468), which was accepted with thanks, and referred for publication.

Mr. Menninger.—I should like to ask Dr. Squibb whether he has had any experience in the changes occurring in essential oils when in contact with phosphorus. I called on Mr. Close while he was making an emulsion with wintergreen oil, and we observed that its smell almost entirely disappears on being added to an emulsion made with phosphorus in cod-liver oil. The question would arise whether there is not a change in the phosphorus as well as the oil. It is almost incredible what an amount of wintergreen the emulsion will take up, and the smell be immediately destroyed.

Dr. Squibb.—The probabilities are, I think, that the changes in some particular oils, like that of wintergreen, are very marked. It has not been shown to be so in bitter-almond oil, nor, according to Ashburton Thompson, in peppermint oil, but it is so in wintergreen oil. We know it is so in regard to oil of turpentine, and the question is which oils do not change; and therefore my conclusion that all oils had better be abandoned. In cod-liver oil changes do not occur in any reasonable time, but one cannot tell how soon they may occur. It is a mistake to suppose that such changes occur from contact with air. Abundant evidence in the past has shown there are changes which take place internally where phosphorus is mixed with other substances, and therefore we are in error in attributing these to oxidation alone, or to its contact with air.

Mr. Sharp.—For many years I have had a good deal of experience with phosphorus, and I must say I am a little surprised at the paper of Dr. Squibb, because of all oils I have tried in dissolving phosphorus the cod-liver oil was found to be the most objectionable, on account of its rapid decomposition or change. In preparing small quantities of oil of phosphorus I have seen an actual explosion take place in the oil from its rapid oxidation. Its change is very great. I would also like to ask whether it is necessary to use all the cautions and machinery that he speaks of with other oils.

Dr. Squibb.—My experience has not been very great in regard to the matter. In trying the various oils I have never seen an explosion, but have seen rapid oxidation, and hence the necessity of the cod-liver oil being free from rancidity, because that occasions the difficulty. This machinery that Mr. Sharp alludes to is just what I attribute the success to. You fill the bottle with carbonic acid gas on top of the oil before you put the phosphorus in; then drop the phosphorus in and replace the stopper; then warm the solution until the phosphorus melts; then, by shaking, the phosphorus is soon dissolved, and you have a solution free from pellicle. If you supply the carbonic acid gas to the bottle as fast as the oil is drawn off into the small bottles, of course the air is prevented from entering, no pellicle forms, and no explosion can occur. There will be no oxidation appreciable within the ordinary length of time devoted to it. This solution in cod-liver oil is not my proposition. It was proposed first in Germany, then adopted in France, but has failed in England, and the want of these precautions has been, in my judgment, the reason why it has so rarely succeeded.

Mr. Sharp.—I concluded that the parties who recommended it did not know anything about phosphorus and cod-liver oil, because I gave it a fair trial, and the oxidation was greater with cod-liver oil than with any other oil I have tried, and I have tried most of the oils.

Mr. Rice.—I would like to ask Dr. Squibb whether he has had any experience in the use of amorphous phosphorus. It has come to my knowledge that a great many druggists are in the habit, when asked by physicians in what form they should prescribe phosphorus, especially during the last years, of recommending amorphous phosphorus. In the experience which I have had, that form is one of the very worst in which it can be given, and I would like to know what Dr. Squibb's opinion is.

DR. SQUIBB.—Both of the allotropic forms of phosphorus, when perfectly well washed, according to the experience of the Germans and French, are inert. The phosphorus is then absolutely insoluble, and passes through the alimentary canal. According to Wagner, those who have obtained results with amorphous phosphorus obtained it from a small proportion of phosphorus oxides, or hypophosphorous anhydrid, which is held by the amorphous phosphorus. If that be washed out the amorphous phosphorus is entirely inert, but if it be left in it sometimes becomes toxic on account of it. I think the evidence is established that it is the lower oxides of phosphorus which are poisonous. The hypophosphorous anhydrid is the deleterious agent, and that when entrapped in the red, or in the amorphous phosphorus, has been what Mr. Rice alludes to.

MR. MARKOE.—In speaking on this subject I wish to call the attention of the Association to a successful experiment of mine, in which I succeeded in crystallizing six or eight pounds of ordinary phosphoric acid. I do not know yet the conditions necessary for its successful crystallization. If I find them out I shall report at a future meeting. However, the fact remains that I have succeeded in crystallizing six or eight pounds of ordinary phosphoric acid, and I present these samples. Some of the crystals, when first taken out, were nearly six or eight inches long, and exceedingly beautiful. This took place during the extreme hot weather of July, and it was almost impossible to remove them soon enough to prevent more or less deliquescence.

MR. RICE.—I believe crystallized phosphoric acid is an article in trade. The firm of Schering, in Berlin, has, several years ago, put out hundreds of pounds of it, but I do not think they continued the manufacture, because they found it was unprofitable.

MR. KENNEDY.—In the formula spoken of by Dr. Squibb for the phosphorus pills, it seems to me the excipient soap and the magnesia would work a chemical change in the phosphorus. I should like to ask whether he experienced any change, or made an examination of the pills after having been made?

DR. SQUIBB.—I have not made any critical experiments. I have accepted the fact where there is no white vapor seen, and no change in internal color of the pill, that there is no change; but I do not believe that the pills will keep indefinitely. As I stated, they should be used only in extemporaneous prescriptions. The longest time I have kept them has been a few days. I have seen no evidences of oxidation that were perceptible—not chemically, but physically. The soap is very definite and not likely to change. It was long ago recommended in French pharmacy, and has been used very long, and the magnesia being an inorganic powder and alkaline, has a tendency to absorb and neutralize any hypophosphorous acid that may be eliminated.

MR. KENNEDY.—That is why I think oxides of phosphorus would be formed, the magnesia taking it up as it is formed.

MR WHARTON.—I should like to ask whether the pills are luminous in the dark. I have generally found that phosphorus when it has not become oxidized, if the pill is broken open, exhibits a luminous shine in the dark. I do not know whether the smallness of the quantity in the pill would be such as to entirely obliterate that or not.

DR. SQUIBB.—Any quantity of phosphorus will give a luminous effect, and the fact that these pills will not be luminous has been accepted by me as evidence that they are oxidized. The moment they are exposed long enough to get rid of the ether a slow process of oxidation takes place, and there is a change which takes place as indicated by the color of these powders.

MR. MARKOE.—In regard to the poisonous action of the hypophosphorous acid the question was asked me by Dr. Putnam, of Boston. He saw the statement that it was poisonous, and requested me to furnish him with some. I put a quantity at his disposal, and he made quite a number of experiments on the lower animals, but was not able to get the slightest degree of poisonous effect from it. I have never hesitated to use a slight excess of hypophosphorous acid; in making syrup of the hypophosphites it is used, and if it is really poisonous I think we ought to know it.

DR. SQUIBB.—The theory as well as the experience explains that pretty clearly to my mind. The hypophosphorous acid that we know, and that Mr. Markoe has just spoken of, is a salt of hypophosphorous acid and water; when it is eliminated from phosphorus without the intervention of water, and in a solution where it gets an insufficient amount of water it is claimed to have these poisonous qualities. The superheating has for its object the elimination of all moisture from these oils. That is supposed to be the object for which they were superheated. It is supposed they attract back a quantity of moisture by exposure in dispensing, and that small amount of water is sufficient to determine its decomposition, but not sufficient to render its poisonous qualities of any effect. Another thing in regard to it, which I do not state in the paper, and which I did not consider definitely enough proved to state, is that the statement was given that cod-liver oil alone is a proper solvent for phosphorus in proportion as it is free from moisture and rancidity. If cod-liver oil be taken when the process of rancidification has commenced it becomes a very bad excipient for phosphorus; when the brown cod-liver oil is taken for making a solution of phosphorus, it is utterly futile. It oxidizes at once, and becomes a very bad preparation, but when good, highly refined, or very pure and very carefully prepared cod-liver oil is taken, there is no trouble whatever. In regard to the statements which have been made, namely, that olive oil and almond oil are large solvents of both moisture and air, I am not prepared to confirm it, but it is stated by foreign authorities that olive oil does absorb not less than five or six hundred times its volume of air, and with that the moisture contained in it, and that almost all oils contain air locked up, cacao butter included, and in order to make these a good solvent for phosphorus they must be superheated, to drive out that moisture and air; then if they are to be used as solvents for phosphorus, care must be taken to keep the air out; and that is the whole gist of this plan of mine of having the solution put up in ounce vials, and each used up to nearly the last, and that thrown away.

MR. SHARP.—The oil I experimented with was the best and purest that could be obtained. It was entirely free from rancidity, and the rapid oxidation of the phosphorus convinced me that there was a complete decomposition of the oil.

Mr. Diehl.—I would like to ask Dr. Squibb whether he has himself made any experiments with the vegetable oils, and has been able to detect the difference that he states in regard to the power of absorbing moisture. It seems to me that if we can avoid the use of an oil like cod-liver oil, which is much more rapidly changed than some of the vegetable oils, and substitute one of the latter, that would be much preferable for this purpose. Again, if there is that danger that Dr. Squibb apprehends in the vegetable oils, we may apprehend a similar danger, although it may not be to the same extent, with the cod-liver oil. If that absorbs air and moisture, if that determines the formation of hypophosphorous acid, and if in that condition it is poisonous, we have precisely the same effect to apprehend that we have in the vegetable oil.

Dr. Squibb.—I am glad that question has been asked, because it enables me to say that I have not confirmed the conclusions. I have accepted the conclusions of such men as Wagner in deference to them as being good authorities. That is to say, the statement that cod-liver oil does not absorb air and moisture is entirely taken on their statement. So is the statement that the other oils do. I have used the vegetable oils as a solvent for phosphorus, and have used them superheated, not to the extent directed by the French pharmacists, because I believed that all the good that could be done was done far short of the high temperature they use. They speak of heating olive oil to 600° Fahrenheit. Ashburton Thompson states that should be the case. In the solutions I have made of those oils I have only heated them to 320°. That enables them to retain their color, does not darken the oil or change its sensible properties. Even the finest olive oil is not changed by that temperature, and then it dissolves the phosphorus about as quick as cod-liver oil, and about as quick as before it was heated. I know nothing about the statements I have made in this paper, except within a few months; I have been at work at it about four months, and the earliest solution I have made was not more than four months old; and I want to insist upon that paper taking the ground that that is all I mean, and if it does take that ground, and if the members of this Association are impressed with it, I shall have accomplished my object, because it is very easy to make the oil fresh, and you do not need to keep it. Every man can make that oil. It is a nice and neat process, which may be applied by the pharmacist himself, and then the responsibility belongs to him. All I wish to caution him is not to burn the phosphorus in getting it dry. I burned my fingers and a good deal of phosphorus. I tried all sorts of plans to dry it, but never hit upon anything but this circumlocutory process of chilling it. In wintertime this would be modified, because you could dry it with reasonable dexterity without all these paraphernalia.

Mr. Diehl.—Is it possible to purchase in commerce such oil as is necessary for the purpose of making this solution? Is it abundant in commerce?

Dr. Squibb.—Oh, yes; that is easily answered. I have used for years back nothing but the Norwegian cod-liver oil, which I believe to be the best, and it is quite accessible in any grade you please. You may get it in New York at all seasons, but it is just like Newfoundland oil; you can get it of one kind or another. If I were to make this, and not have the control of cod-liver oil in my own hands, I should use that of Mahler, which is put up in small bottles, and I would counsel others to use that. He objects to putting it up in any larger bottle than eight ounces, because he maintains before eight ounces are used rancidification occurs. This security from an honest man like him is of value to us as pharmacists, where we want oil for a purpose like this, and I believe the oil I use is just about like his.

Mr. Sharp.—I would like to ask Dr. Squibb why he considers Norwegian oil any better.

Dr. Squibb.—It is blander, and has been in use in Great Britain and other countries we are familiar with the pharmacy of so much longer, and is so much preferred there. You go to London, where perhaps they have used more cod-liver oil than in any other city on the globe, where certainly they began earlier and have stuck to it longer; they prefer, as a general preference, when price does not come in, the Norwegian oil, but of a particular grade; not of the ordinary, but of the grades prepared from the livers before rancidification sets in. The statement is made in regard to the Norwegian that the fisheries all cease by the end of April. They do not catch cod-fish after the end of April. That is the natural consequence of some of the habits of the migration of the fish; therefore they don't make it in a season when the temperature is sufficient to start the rancidification, so it is the natural effect of collecting the cod-liver oil on a coast where the temperature never reaches the rancidifying point before the cod-liver oil is got out and properly preserved. I think it is an accidental occurrence, but it is of great importance to us.

Mr. Sharp.—I don't think the fact that Great Britain uses it extensively is any reason to suppose it is superior. I have seen cod-liver oil purchased in New York and elsewhere perfectly sweet, and as far as my taste is concerned far superior to any I have ever seen imported. I can name some brands of Newfoundland sweeter and better—I have tasted it for my own satisfaction—than any Norwegian oil I ever saw.

Prof. Sharples.—It strikes me Dr. Squibb's difficulty might be got over by first taking and balancing the bottle, then putting in any indefinite quantity of oil; then carefully drying the phosphorus, dropping it at once into the oil, and weighing again, so as to ascertain the exact weight of the phosphorus, and then making up the whole mixture to one hundred times the weight of the phosphorus, avoiding that extremely difficult operation of weighing the phosphorus in the air.

Dr. Squibb.—The object is to dry the phosphorus before putting it in the oil.

Prof. Sharples.—The drying would be done in the same way, but it would not be weighed the same way, because it would be dropped into the oil and weighed in the oil, so you would not have to cool your capsule or keep it in a cool capsule.

Dr. Squibb.—There is no difficulty in that. My object in that is to gain accuracy for ordinary use, by persons who are not perhaps skilled in the weighing of substances to great degrees of accuracy. My idea was to adapt it to my own and other ordinary uses in an easy way that was pretty secure; not merely to avoid trouble.

MR. MARKOE.—I would like to recur to the question of hypophosphorous acid. If we are not to apprehend any danger from this, when the term is properly applied, it is very important that that misstatement should be corrected, and that the discredit should be put where it belongs.

DR. SQUIBB.—You know acids are defined to be salts of hydrogen.

MR. MARKOE.—We know, then, that the acid is not poisonous, but its anhydrid.

MR. DOHME.—Would not the anhydrid become hydrated the moment it comes in contact with the fluids of the mouth and the stomach?

An invitation was received from the Zoological Society of Philadelphia, inviting the members to visit the Zoological Garden free of charge. The invitation was accepted, and the Secretary was instructed to return thanks for the same.

Dr. Squibb offered the following:

Resolved, That the American Pharmaceutical Association devote an hour of its third session to a discussion of its interests in the United States Pharmacopœia, with a view to the adoption or rejection of the following preamble and resolutions:

WHEREAS, By the action of the American Medical Association, at its recent meeting in this city, it is proposed to discuss at its next meeting, at Detroit, in June, 1877, a proposition for that Association to assume control of the National Pharmacopœia; therefore,

Resolved, That this Association offers to the American Medical Association its hearty co-operation in the work, in any way that the American Medical Association may find the services of this Association most useful.

Resolved, That a copy of this preamble and resolutions, with the discussion had thereupon, be forwarded by the President of this Association to the President of the American Medical Association.

This resolution explains itself. I only wish to offer it at this time, before we separate in order that it may be thought over a little, and that by the adoption of this resolution an hour may be appointed this afternoon for the discussion of this important subject.

The resolution was adopted, and the Association then adjourned to meet again at half-past three o'clock.

Third Session.—Thursday Afternoon, September 14.

The Association was called to order by the President, at the proper time.

On motion of Mr. Roberts, the reading of the records of the preceding session was dispensed with.

On motion of Mr. Kennedy, a vote of thanks was tendered to the retiring officers.

Mr. Remington introduced Mr. Daniel B. Smith, the first President of this Association, in 1852, and one of the original members of the Philadelphia College of Pharmacy; also Mr. Peter Williamson, who acted as Secretary, when the College named was established, in 1821. The gentlemen were conducted to seats upon the platform.

MR. WILLIAMSON.—I regard it as a compliment to be introduced to so large and respectable a meeting of the members of my profession. I regret that my age prevents me from entering into the interesting matters you have in hand. I am too old for anything of that kind, so you will not expect it of me.

The resolution of Dr. Squibb, offered at the close of the previous session, was now called up.

DR. SQUIBB.*—MR. PRESIDENT AND GENTLEMEN OF THE ASSOCIATION: The object of this resolution is to bring before you the important subject of the United States Pharmacopœia of the future, so far as the interests of this Association are concerned, so that by discussion and by an interchange of views, among those present at this meeting, all may have the subject before them in its most prominent bearings for mature deliberation during the coming year, and go to the next annual meeting prepared to act upon the preamble and resolutions suggested with an amount of care and caution proportionate to the grave importance of the subject, and the serious results which would follow any unwise or hasty action.

The first question to be considered is whether pharmacists have any reasonable or just causes of complaint to prefer against the present Pharmacopœia, and if so whether these are due to the present plan of revision and manage-

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* In consideration for a resolution passed by the Association, aiming at a more careful review of the remarks and discussions of the Association before they appear in the published "Proceedings," Dr. Squibb asks the Executive Committee to substitute the following for the remarks as actually made. He believes this to be a condensed statement of not only what he really said, but of some things which he should have said in order to make the presentation of the subject more clear and complete, and that the subject is altogether better and more fully presented here than it was at the meeting.—*Executive Committee.*

ment. Then, should this be probable, can the present plan be so amended as to give promise of material improvement in the future; or, can a new plan be suggested that will afford probable advantages enough to justify a radical change from the present one, which in the main has done so well for so many years.

A free discussion of these points may bring out others, in detail, and will set all to thinking upon the matter, so as to go to the next meeting better prepared for wise and deliberate action.

That pharmacy has just and reasonable causes of complaint against the present Pharmacopœia may be supported by the following propositions: First, that it does not represent the progress in pharmacy up to the time of the last revision; and that its more frequent revision, though authorized, has not been attempted by the Committee of Revision. Secondly, that its descriptures and details are insufficient for the attainment of its objects, so far as pharmacy is concerned. Thirdly, that its processes are, many of them, unnecessary and therefore useless; that some of them are defective, while a few are positively bad. Fourthly, that there are more errors in it than the character of the work should admit.

That these objections to it are due to the present plan of revision and management may be shown to be probable by the following circumstances. The labor involved in bringing the Pharmacopœia up to the level of pharmaceutical progress at the times for its revision has always been great; and, increasing rapidly with each revision, has now become very great; far too great to be required or expected from any committee of revision acting voluntarily and gratuitously, while no adequate provision has ever been made for paying for the labor involved. When the work was mainly and so admirably done by Drs. Wood and Bache in the past, it was well and amply paid for by the subordination of the Pharmacopœia to the Dispensatory of these authors, which latter, as a private book of its authors, has been deservedly one of the most popular, most useful, and most lucrative books of the age. It nevertheless embraced and overshadowed the Pharmacopœia which was its basis, and gave to its authors the profits of their labors, both upon the Pharmacopœia and Dispensatory, by placing both in an official relation to the Materia Medica and Pharmacy of the nation. Beside these authors, no one has ever received any material consideration, directly or indirectly, for any labor given to the Pharmacopœia. At the time of the last revision Dr. Bache was dead, and Dr. Wood so infirm in health that his services were not useful, but were rather obstructive in the committee; and have continued to be so unserviceable to the Pharmacopœia interests, that now, while his Dispensatory still overshadows the Pharmacopœia, it does not embrace it, and has not been revised to meet the wants of the present plan of revision; whilst, by allowing his publishers to change the date on the title-page of the Dispensatory, it appears to post-date the last revision of the Pharmacopœia, which it does not contain nor comment upon, while it still, in a large measure, takes its place. Thus the Dispensatory, once far more important and far more valuable than the Pharmacopœia upon which it was based, more valuable even in the truest interest of that Pharmacopœia, has now become obstructive to that interest; and this from no fault of its authors, nor any undue greed of gain, but simply because such labor as they gave never should be expected nor asked for, and never can be justly obtained or used without being well paid for. It, therefore, follows that as the services of Drs. Wood and Bache are no longer available to the Pharmacopœia, their mode of having its labor paid for can no longer be depended upon. And, as this mode is an inseparable part of the present plan of revision, the plan must be objectionable, and cannot reasonably be expected to yield better results in the future than at the last revision, where a committee of five or more gave their time, knowledge, skill, and labor, as it could be spared, through a period of more than two years, gratuitously. From this it would appear that the present Pharmacopœia is as good as could be justly expected, and that its defects may be in great measure chargeable to an attempt to get important labor, which but few have the knowledge and skill to render, without paying for it. If this be true, and if it be unjust and absurd to claim or expect expert labor unpaid for, then the present plan of revision and management is so defective that it never can represent the progress of medicine and pharmacy to the time of revision; and as the more infrequent the revisions the greater the labor; and the more rapid the progress in medicine the more frequent the revisions are needed, it again follows that the present plan is insufficient and needs reform.

Next, can the present plan be amended without radical changes? It seems doubtful whether a plan, the basis of which is voluntary labor throughout, and which was only successful so long as this basis was true only in appearance, can ever be successfully amended. Efforts were made in that direction in the conventions for the last two revisions, and in the Committees of Final Revision and Publication, but with little, if any, benefit to either the committees or the work. For example, it was proposed and carried in the convention to expend the income from the copyright of the book upon it, first, to pay for the expert labor upon it, and then all the income over that to be expended in cheapening the book to the medical public. But while it was supposed that the income could not be large, so long as the book was embraced in and substituted by the Dispensatory, and was kept in the condition of a mere outline or skeleton, requiring the Dispensatory as a commentary, to render it of much service to either physician or pharmacist; still it was indefinitely known that a large number of copies were sold, and that the copyright had a definite value. Information on these points was sought for from the publishers by official resolution of the committee of 1860, but was declined; and after this rebuff from the publishers, a resolution in the committee to offer the copyright to competition among publishers was rejected by the committee, and the copyright has continued always in the same hands, with but an insignificant yield to the committee for small expenses at the time of revision each ten years. Therefore, as it has up to this time been impossible for either the convention or its committees to know much about the copyright or its value, and therefore to make any amendments in its plan based upon the income from the book, it seems probable that in this direction at least little can be expected short of a radical change in the design and character of the book, and change of hands for its control and management. In the last revision the convention failed to control its committee in the work, or, rather, the committee did not carry out the directions of the convention, and the convention has no redress; for, by its own organic provisions, it can only be called once in ten years, and then by the chairman of its own committee, which declined to carry out its orders. That this plan ever did work well seems to be due to the great ability and labor of Drs. Wood, Bache, Carson, and Bridges, and Messrs. Procter and Taylor; and that the first two were indirectly well paid for their labor by this plan of making a Pharmacopœia which should require a Dispensatory, and then making a Dispensatory as a private and profitable enterprise, whose success depended upon its being still more profitable to those who bought and used it than to its authors.

It follows, then, that the professions of medicine and pharmacy have had full value, and perhaps many times the value, of all they have ever paid for both Dispensatory and Pharmacopœia, and owe beside a large debt of gratitude and credit both to the plan and to its able and indefatigable authors and workers. But, unfortunately for the professions, the authors and workers are no longer available by reason of the unsparing hand of Time, and the thirteenth edition of the Dispensatory remains year after year unrevised, until it has become simply a book of reference for the past, and a blind to those who go to it for the progress of modern knowledge.

As a summary of what has been said, it may be suggested that any amendment of the present plan which does not embrace a Dispensatory, or its equivalent in the Pharmacopœia itself, will be no improvement upon the past. And that such a change in the Pharmacopœia itself would involve labor that must be paid for in some way; and that this, if accomplished, would not be an amendment of the present plan, but would be a radical change to a new plan.

Next, can a new plan be suggested that will afford probable advantages enough to justify a radical change from the present one, which in the main has done so well for so many years? This is a most serious and important question, and one which well deserves a year of careful thought and consideration, if it is to be wisely answered. It seems altogether probable that some plan can be found that is better for this time than the one which was applicable thirty or forty years ago, and then yielded its best work. And in view of this probability the following plan was submitted, with some hesitation and doubt, to the American Medical Association, at its meeting in this city, in June last. The plan was favorably received, and was made the special order of business for ten o'clock of the second day of the next annual meeting, and the President of the Association is recommended to consider the subject in his annual address. It will save time and space here if the members of this Association will read the remarks made in presenting the subject at that time, as it is intended that those remarks, and these now made, shall, when taken together, cover the whole ground of this preliminary stage of the discussion. The remarks may be found in the "Transactions of the American Medical Association for 1876," when published; but have been already published in "New Remedies," for July, at page 217.

The plan suggested for thoughtful consideration is as follows:

That the American Medical Association, as the only concrete body or organization which fairly represents the whole medical profession of the United States, and, therefore, as really owning the United States Pharmacopœia as one of its most important general interests, should now take possession of the Pharmacopœia and control it henceforth.

That it should control and manage the Pharmacopœia by means of a council to be styled the Pharmacopœial Council of the American Medical Association. This council to consist of a chairman and four other members. The chairman to be nominated by the Nominating Committee, and elected by the Association as often as the chairmanship may become vacant by action of the Association, by action of the council, or by death or resignation. That the American Medical Association invite the Surgeon-General of the Army, and the Surgeon-General of the Navy, each to select and appoint a medical officer from their respective corps, and invite the American Pharmaceutical Association to select and appoint two pharmacists to constitute the pharmacopœial council.

That this council under the American Medical Association shall be charged with the entire control and management of the Pharmacopœia in all its details, and be empowered to employ one or two editors and other experts when necessary to do the work properly, and to use the income from the copyright of the book to pay its expenses.

This council should be ordered to revise and publish the Pharmacopœia once in five years, and to issue a fasciculus or small inexpensive volume in addition, each year, giving the best attainable information in regard to new remedies and their uses, and the important elements of progress in the Materia Medica and Pharmacy up to the time of the annual publications. At each quinquennial revision the well-established progress of the five years to be embodied in the standard book from the fasciculi. Thus each fasciculus would become a useful ephemeris for its day, and these ephemerides would serve not only to keep the professions of medicine and pharmacy informed in regard to the novelties as they might occur, but assist in discriminating between the good and the bad, saving both professions from some of the influences of fashion, frivolity, and mercantile speculation in medicine. There is probably nothing that the practical physician and pharmacist need more than some authoritative assistance in discriminating between that which is reasonable and sound, and that which is merely plausible and ingenious in the Materia Medica. And it is probable that there could be no better way of giving this assistance than in close connection with the authorized Pharmacopœia, and yet without embracing the novelties within the Pharmacopœia until they should be well tried in a prescribed and uniform way, under authority, and thus become established upon some degree of accuracy and uniformity of conditions for observation.

Such a council, fitted without special training to take up such a work and do it moderately well at once, certainly could not be found in this country. But by careful selection, the responsibility for which should rest heavily upon the selecting bodies, a council might be made up of industrious, energetic men, accustomed to accurate work, who would be willing to train themselves for it, so that in a year or two from their appointment they would be ready to begin their work, and then grow in knowledge and adaptation with the work. Two editors, to be secretaries of the council but without votes, might be needed at the quinquennial revisions, and one would be needed permanently to continue the work under the chairman of the council without cessation or interval. This permanent editor should be a well-trained expert, and such a one would be very difficult to find, and would probably have to be changed until the requisite ability was found, and then be specially trained to the work. In short, the organization of such a council would be, with all the caution that could be used, a difficult work, and one full of obstacles; but might not be impracticable if the labor could be paid for in reputation and in money as it should and must be to be successful. Such a council would not have to meet frequently, certainly not oftener than four times a year, but would of course have much research and reference work on current medical literature to do at home, as for example the army and navy members at their unrivalled libraries in the Surgeon-General's office and at the Smithsonian Institution; and the copyright might not be at first sufficient to pay well for such work. But if such a council should be happily found as would by sound and accurate knowledge and persistent labor, produce a work that would meet the wants of the two professions in any reasonable degree, there can be no doubt that the work would within a very few years sell to an extent to recompense the labor given to it, for if anything be certain such recompense is certain in accurate proportion to the true soundness, quality, and amount of the labor bestowed upon it. The only probable serious difficulty would be that a year or more of the hardest labor would have to be given before the copyright could be offered as a source of income, for such a council should neither hypothecate its labor nor go in debt even if it could do so. But this difficulty does not seem insurmountable when the character of such men as must be selected for such a council, and the character of the bodies they would represent is duly considered.

It was first thought that such a council might be a little larger, say eight members; but beside the greater harmony and smoothness in working of the smaller number, it is doubtful whether the income could ever be made sufficient to adequately pay for more than one competent editor to do the continuous detail work, and five members or councillors for the intermittent duties, whilst the work once fairly started, and the workers trained to it, would not be greater, nor take more time than could be well spared by five men who were at the same time actively engaged in the general duties of their respective professions.

The idea of a standard Pharmacopœia and an ephemeral adjunct having a value to the professions proportionate to the ability and labor with which the plan was carried out, seems well worth earnest thought and discussion, and the subject should be discussed freely and temperately, not forgetting for a moment that the elements of success in such an undertaking are very costly and difficult to secure; and that schemes of this kind may be ingenious and plausible, and may even be very sound and good, and yet prove impracticable, so often does ingenuity mask true utility. And yet there is no better way of making sound progress than by means of a well-digested theory earnestly tried.

This plan has been gradually reached through many phases and modifications, as thought over and talked over with interested and intelligent friends for some years past, and now when it is time that it should be publicly suggested for whatever it may be worth, it is still immature and is set forth with diffidence, but as the best that one mind can do on so important a matter, with the hope that it may elicit a discussion here now that will bring out new points and new details, to serve as food for reflection during the year which is to elapse before action be taken upon the subject in this Association.

MR. JUDGE.—The members of this Association are well aware of the fact that they have a general committee upon the revision of the Pharmacopœia, and that committee has intrusted to me the duty of saying a few words and presenting their views in brief upon this subject. That general committee has been subdivided into committees for special work. They have, during the meetings of this Association, decided upon the method of work and the general principles which should enter into and guide them in the revision of the United States Pharmacopœia, so far as the interests of this Association at least may be involved. While the committee has no desire to deny to the medical profession of the United States (and in using that term I use it certainly in a different sense from that in which Dr. Squibb has used it; that is, I mean the medical profession as such not including the pharmaceutical as a distinct section of it, but as a co-related profession), while we do not wish to deny to the American Medical Association or to the physicians represented in it their due share in the revision, we believe that the resolution as offered indicates a position on that revision that is not equivalent to the position, the rights, the dignity, and the interests involved in the United States Pharmacopœia of this profession. We believe the pharmacists have a deep and abiding interest in the Pharmacopœia, that it is a matter of vital importance to us that it shall be perfected as far as possible in its processes, in its descriptions of pharmaceutical preparations, the means of detecting their impurities and of determining exactly the character of the results that are to be derived by the various processes. Now, while we desire the co-operation of the Medical Association of the United States, we think it should be upon a more equal basis than that offered. The work must ultimately devolve, so far as the labor of investigation and the final results are concerned, more largely upon the members of the pharmaceutical profession than upon the medical profession. The Pharmacopœia certainly presupposes that medicinal agents shall be selected especially with a view to their usefulness to the physician. The medical profession, therefore, certainly have a right to direct what substances shall enter into the Pharmacopœia, their general character, and the preparations, but the details of the work devolve certainly upon pharmacists and pharmaceutical chemists, who are more or less acquainted with the interests and details of pharmacy. Therefore I believe, as the committee believes, that this Association is entitled to a position, not of simply assisting, but of equal co-operation in the production and issue of the Pharmacopœia. In view of this fact, and expressive of the sentiment of the committee, I beg to offer as a substitute—not intending it to be in opposition, but simply carrying out more thoroughly the idea that we, as pharmacists, entertain—this preamble and resolution :

WHEREAS, While at the time of the formation of the United States Pharmacopœia the method adopted for that purpose and subsequently continued for the revision of the same was adapted to the then condition of the medical profession and apothecaries of the United States, the time has arrived for the use of better and more perfect means for accomplishing the revision of that important work, and

WHEREAS, the pharmaceutical profession is advanced to a position, and by its great interest in the Pharmacopœia is entitled to take a prominent part in the revision of the same, therefore,

Resolved, That this Association invite the American medical profession to co-operate with us in the said revision, and that they appoint a committee to act with our committee in conducting said revision.

MR. COLCORD.—I feel deeply interested in this subject. One thing is pretty certain, that none of us, neither the medical nor pharmaceutical professions, are satisfied with the Pharmacopœia that we now have, or the way it is made. Now, sir, as a member of the last Pharmacopœial Convention, I would say that the apothecaries were more in relative force than the medical profession at that convention, and the trouble was not that we were not allowed to do our share of the work, but that the medical profession, having the largest number of societies and incorporated institutions there represented, did not come up and do its share of the work. The United States Pharmacopœia has always been published in one city, and by one set of men, and it got into a rut, and became a Philadelphia institution. Not but what that made a better Pharmacopœia than it would have been if it had gone to Chicago or Boston, but it was a local institution. I think this proposition, coming from Dr. Squibb, is correct, that the Medical Association and the Pharmaceutical Association, being national institutions, and representing the whole country, should take this work and do it. If I made any objection to his proposition, it would be that it embraces the army and navy, who administer their medicines as a specialty, if you please, from their medicine chests. The selection of general practitioners for such positions would better represent the medical profession than does the army and navy; but then, as Dr. Squibb says, the army and navy can select officers all over the country, and it begins to be my judgment that they can get representative men from the army and navy who will do the work better than the rest of the medical profession. I do think, with Dr. Squibb, that in such a council pharmacy will have its full share by giving the doctors three and itself taking two. We must have a work that the apothecaries all over the country will use as authority. The Pharmacopœia is not authority with many of us, not with Dr. Squibb even. When the Pharmacopœia is so compiled that we have to swallow a Philadelphia book and Philadelphia pills and fluid extracts, I submit it is perfectly ridiculous

A great many points are to be taken into consideration. We stand in the position of commercial men. We have, say, a thousand prescriptions come into our stores to be filled, and five hundred of them are for pills and three hundred for elixirs. The physicians prescribe these elixirs and pills sugar-frosted and gelatin-coated, and the idea is preposterous that we have a Pharmacopœia and the medical profession should ignore it, and prescribe patent medicines, and compel us to dispense them. If we can get a Pharmacopœia that shall represent the state of pharmacy and medicine in the country, something we can all agree to, it would be a great deal better than what we have now. I agree with Mr. Judge, that we ought to have a large representation; still I think two-fifths of that representation is enough. There is one fact about the Pharmacopœia I wish to state: every physician, especially if he has a large practice, gets a circle of about fifty medicines, which comprises his whole pharmacopœia, and he thinks the whole country ought to be bound by it. Go one hundred or one thousand miles from him and another fifty will come in, and so on.

I am glad that this proposition has come up to-day, and I hope that all that have any objections or ideas will submit them, so that we can act intelligently upon it at a future time.

MR MOORE.—There has been a great deal said in regard to the revision of the Pharmacopœia, but, while there is a very great deal of objection to the old manner of forming this Pharmacopœial Convention, yet I do not think there really was so much fault with the convention as there was with the subsequent working of the revision. It is true that the convention made a very serious mistake by believing that there was but one man in the world that could write on materia medica, and placed him at the head of the Revision Committee. Probably by the time of the next revision we will not have that difficulty standing in our way. The Pharmacopœia is a book which the pharmacists are interested in peculiarly. I don't suppose, if you look the United States over, that you will find twenty physicians in one hundred that ever see it, and they don't know whether it is good or bad, or what is officinal and what is not. Wood and Bache is their authority to-day, and will be twenty years from now unless there be another work to take its place. As a pharmacist, I would not be willing to throw myself into the hands of such, as a class, impracticable men, who in that branch do not seek for knowledge. They ought to have the exclusive right of selecting the materia medica, and determine what preparations ought to be adopted; but the mode of manufacture is our business, and we should work out the processes. When the convention met in Washington, we had quite an exhibition of medical men who came in and were reported, but were not seen and have not been seen since. The work fell mainly upon pharmacy. The medical men did not offer much for the revision. It would have been done much better if pharmacists only had been on the Committee of Revision.

MR. KENNEDY.—It is true that physicians know very little about the impurity or purity of drugs. Only a short time ago I showed some of Dr. Squibb's pure chlorate of potassium to one of our physicians. He looked at it and said: "Chlorate of potash is chlorate of potash, and calomel is calomel, all the world over." Such men should not get into the National Convention. I have no objection to Dr. Squibb's resolution, provided I was sure there would be good men to represent the Medical Association. Should this not be the case we would get into great trouble, and it would be much worse than it has been hitherto.

MR MARKOE.—I must bear my testimony as one who comes in contact with a good many physicians in New England and in Boston. I must say, after carefully looking over the field, and being personally acquainted with the leading physicians, that the United States Pharmacopœia is practically a dead letter. Ever since the proposition was made by Dr. Squibb, that they should take the exclusive charge of the Pharmacopœia, I have taken some pains to communicate with the leaders on this subject—I have seen the President of the American Medical Association—and, so far as my inquiries have gone, the feeling seems to be, on the part of the physicians, that it is our business to make the Pharmacopœia. I told one of them it was their business to dictate what should go into the Pharmacopœia, and all we wanted was the exclusive right of working out the practical details. One or two of them said: "You should get up the whole of it. You know what we want. It is a special branch of medicine that you have in charge; the therapeutic effect of the medicine is all we have to look out for." These remarks were made by a professor of one of the leading colleges. I am willing to concede an equal representation of both professions in this change. I don't think I would accede to anything else. In any event, I feel clear in my conviction that the work will fall mainly upon pharmacists to do the actual work. The most that will fall upon the physician will be to determine the value of a given medicine as a therapeutic agent, and what shall be the therapeutic doses, but that is a work of minor importance. So far as its practical working has been, the main object of the Pharmacopœia has been to give us, not only a recognized list of medicines, but also good, thorough, working formulas, so the letter of the Pharmacopœia shall accord with its spirit. As it is now, we have to use our judgment to get at the spirit of the Pharmacopœia from a very imperfect letter. That is conceded on all hands. We all strive to get at the intention of the Pharmacopœia, because the practical details are so very unsatisfactory as to give, in many instances, very unsatisfactory results. I don't know that I can say more than that, but I don't think the American Medical Association want anything more than an equal representation. I think it would be difficult to get more than that. So far as the matter of getting incompetent representation from the medical profession is concerned, I have no fear whatever. There are many physicians who have made a specialty of chemistry, and are well posted in materia medica. I don't know that I can give any better proof of this, than that the American Medical Association has such delegates as Dr. Squibb. He represents one of a class of physicians who, by taste and by education, direct their attention just as closely to pharmacy and materia medica as others do to ophthalmology or any other branches. So I do not think there is any doubt but what we shall get the best talent in the profession. I believe this is a better method of representing the true progress in our profession than the old arrangement. I especially believe in the project of employing expert labor to do the work, for it is altogether too much to ask, as Dr. Squibb says, that men who are crowded with business, men who are not rich, to devote two or three years of their time to gratuitous labor. The mere perfection of a single formula will sometimes require weeks and months of labor, and we have no right to ask for it without remuneration. If we find men who are so public-spirited, and situated in such a way that they can afford to spend the time, we are quite ready to take them, but I think it is better to employ experts as we do in any other business, and I hope that idea will be carried out. The plan works perfectly in Great Britain. The first issue of the British Pharmacopœia was a bad failure. It was because an attempt was made to issue it under the sole guidance of the Medical Council. It was picked to pieces in a very short time, and a revision had to be made almost entirely. The next step was a wise one, the employing of a paid editor, Dr. Redwood, an expert of acknowledged ability, and Professor Bentley. The Medical Council decided what changes should be made, and these two experts worked out the results, having no vote, and submitted them to the British Council. The result is that the British Pharmacopœia is far in advance of ours. The same plan of publishing a fasciculus has worked well; the British Pharmacopœia is a progressive one, and a work that represents very fairly the position of pharmacy in Great Britain. What works there ought to work here, because the practice of pharmacy there and here is so nearly allied that they might be treated as identical. I hope this will go forward, and we shall not make it a point of considering which shall have a little larger or a little smaller representation in the work.

MR. EBERLE.—It appears to me that the real issue involved in this discussion, so far as we as pharmacists are concerned, is not whether there is a necessity for a revision, because that is certainly admitted. All that Dr. Squibb has said in relation to it is entirely correct, but he comes before us with a proposition that may not probably be just what pharmacists would like it to be, and which probably does not represent, in their opinion, the standing and dignity they should take in this matter. We should not lose sight in this discussion of the remarks and resolutions offered by Prof. Judge, which, in my opinion, bring forward the true issue, that is, what is to be the proper status of the pharmacists. In accepting Dr. Squibb's suggestion are we subordinate, or, in other words, a special branch of the medical profession, giving them the authority to call upon us as a collateral branch of their profession for assistance, and which, by the way, they have not done. The resolution offered does not suggest that they have done anything of the kind, but intimates that we shall tender our services to them. It occurs to me in this way we are really seeking recognition. Dr. Squibb thinks it is unfortunate that the two professions should be considered as separate, and that there should be any antagonism between them; but we know that the pharmacists, as has been asserted here this afternoon by parties who were on the committee of revision of the Pharmacopœia, have, in seeking this desired result, the attainment of a perfect Pharmacopœia as near as possible, done all the praying, and the doctors and physicians all the cursing, and the question is whether the pharmacist is not entitled to at least half the salvation.

DR. SQUIBB.—The reason why the Pharmacopœia has not been recognized by the medical profession, I think, is very clear, namely, that the United States

Dispensatory has always taken precedence of it. The Pharmacopœia was made so as to require a commentary, and the Dispensatory has sold because it embraced the Pharmacopœia and commentary at the same time. It has been of the same use to the physician that I propose the Pharmacopœia shall be hereafter. I do not propose that it shall require a commentary, or that there shall be anything in the United States which shall compete with the Pharmacopœia; that it shall be so full and complete within its own covers as to take the place of any commentary outside of the works on therapeutics. Those are the only works the physician wants. The point I desire to make is, that the Pharmacopœia has not sold in proportion to its deserts, and the Dispensatory has, because the Pharmacopœia and Dispensatory were made to go together, and we want something to go alone. Another point I want to make is in relation to the physician being so very ignorant while the pharmacists are so very wise. We must bear in mind there is another side to that; if we were listening to a discussion in the American Medical Association we should have the other side. What I fear now is that this Pharmacopœia will be taken by the American Medical Association whether we like it or not; and we as pharmacists (I am speaking as a pharmacist and not as a member of the American Medical Association) shall be obliged to take the position the British pharmacists have taken. They are not admitted to the work in Great Britain. Their editors are medical men, and both graduates of medicine and are both hired, but have no vote. If we can get a co-operation which shall be as nearly uniform as I propose, I think the work will go on more harmoniously and attain to better results than the British The British Pharmacopœia is a skeleton. It has been a success which it never would be here. It compares with ours not very favorably in the detailed directions which are not contained in the British Pharmacopœia, and the fasciculus issued by the British Pharmacopœia is not one in the sense I mean, but a little addition to the Pharmacopœia, to correct some mistakes and add one or two things we would consider of no importance at all. I want to get this Association to thinking about this matter, as to whether they will of themselves undertake the labor and make another Pharmacopœia, so that we shall have two, for I have no doubt that the Medical Association will take the matter up. Now, if this Association take Prof. Judge's view of the case, and says, "We are the big body, and we must invite them as equals, and not give them the lead," or "We will not have anything to do with it unless they admit us on a scale of perfect equality with themselves," we run the risk of having two or three Pharmacopœias, and the moment we do that we will have a confusion which will make us worse off than we are. Both of these associations are without legal status in this country. They are voluntary associations. What is to hinder me, if I am a very active and energetic man, from getting up another association and issuing a third Pharmacopœia? What is to hinder the Convention from getting out a Pharmacopœia of its own, continuing its work, and issuing another Pharmacopœia in 1880? There is nothing to prevent us in the future from the possibility of having as many Pharmacopœias as there are organizations. The question for us to decide is, can we harmonize so as to have one Pharmacopœia? I do not propose to have my resolution acted upon this year. If

Prof. Judge's is sufficiently the will of the Association to be passed now, very good, but I do not propose to move in this until the American Medical Association move. I propose they shall ask us to help them before we volunteer. I propose this resolution to lay over until next year. Our meeting occurs a month and a half after their meeting. Let us wait before we do anything. This is a mere proposition for us to think of until the time comes. They will take the lead of us a month and a half. If we want to be liberal and be generous, as everybody can afford to be who do all the work while the others do nothing, we can afford to give them their representation.

Mr. Judge.—The propositions that come before us are somewhat unequal in their bearing. The proposition that the committee has presented through myself proposes co-operation. Now, if that proposition is adopted to-day (and I will just say in passing that I myself am a medical graduate; I therefore stand, as Dr. Squibb does, upon both sides of the fence, and am capable of taking a comprehensive view of both sides of the field), if this resolution to invite co-operation passes, it does not follow that they follow us or we follow them. If they appoint a committee to act with our committee a uniform plan can be agreed upon that will come within the desires of both Associations; but let the Medical Association meet, digest their plan, and then afterwards leave us to present our proposition, they may naturally say, "Gentlemen, we would gladly have co-operated with you had we known your desires in time; but now we have arranged our household, our plans are made, and we must progress in this direction." I therefore say that the proposition offered by the committee can do no harm. It simply invites co-operation. It is more likely to bring about the desired result of harmony than if we let the matter drift until a determined position is taken by one Association. Then it will perhaps be too late for that intimate harmonious co-operation which the gentlemen present desire. I think, therefore, it would be best to adopt the substitute, and next year when the Medical Association meets they will step forward to grasp hands, and we will co-operate in this work without any of the jealousies that have been hinted at. So far as the inferiority of some physicians, and a host of pharmacists, is concerned, we are all aware of it, but it is not the laggards in either profession that do the work, and the less said of the deficiency in either profession the better under the circumstances. It is not with any view to the incapacity of the medical profession—I do not refer to that in the least—that I claim that the pharmacist is entitled to an equal position in this work, but it is with a view to the final result that I think we should be placed side by side, and co-operate with the medical profession in bringing about that result we desire. I therefore hope the members will adopt the preamble and resolution presented by myself on behalf of the committee.

Mr. Wharton.—To bring this subject up in a little different form from any I have heard up to this time, it seems to me if a couple of persons were carrying a heavy weight, and found it was going to prove too heavy for them, and they should call in one or two more, as they wanted, to assist them in carrying that load, it would not throw any discredit upon and not be assuming any superiority over the persons whom they invited. Now we, as a Pharmaceutical Association, have had in charge heretofore this Pharmacopœia.

Dr. Squibb—Oh, no; that is a mistake. It was totally medical to 1850, but from 1850 to this time pharmacy was also represented by the incorporated Colleges of Pharmacy, but not this Association. This Association has never had anything to do with it. Its committee is a voluntary committee and a self-constituted body of our own. The American Pharmaceutical Association in appointing this committee did a voluntary work, and the action of this committee, that has been published within the last three or four months, has created a good deal of antagonism. It appears to the medical reader that it has taken possession of the Pharmacopœia; that the chairman of that committee is now the man that is to be looked to for the forthcoming Pharmacopœia, and it has been remarked by the medical men, "How is it that the American Pharmaceutical Association has taken charge of the work? They have divided off the work and are going to do it."

Mr. Colcord—The work of the American Pharmaceutical Association will have to be carried to the Decennial Convention through the colleges of pharmacy, or some other channel.

Mr. Wharton.—If the physicians have always had a hand in it, why is it that we are discussing the question now?

Dr. Squibb.—In order to get a hand in it ourselves.

Mr. Bedford—I think there has been a little misunderstanding in regard to the object of the resolution and preamble of Dr. Squibb. It was supposed we were to take some action upon it, and that the action would be based upon his resolution. With that in mind the committee afterwards requested Dr. Judge to draw up his resolution. I would suggest, with the approval of some of the members of the committee, a little alteration in the wording of it. I believe there would be no objection, no antagonism, nothing of the kind to the last part of it. The resolution as read was, "*Resolved*, That this Association invite the American Medical Association to co-operate with us in said revision, and that they appoint a committee to act with our committee." I would suggest this alteration. "*Resolved*, That this Association will willingly co-operate with the American Medical Association in the work of the revision of the United States Pharmacopœia, and that the appointment of a committee by the American Medical Association will be met by the appointment of a committee from this Association at its next annual meeting." That is the idea I wish to convey; that we will willingly co-operate?

Mr. Colcord.—Why not stop there?

Dr. Squibb.—The issue is then simply who shall invite; whether they shall invite us, or we shall invite them. If the original body be the body to move first, I think there can be no doubt about who is to take the lead.

Mr. Judge.—We will accept Mr. Bedford's form of resolution.

Dr. Squibb.—That is my resolution.

Mr. Judge.—Not exactly.

Mr. Rice.—I think that covers the point better, because although it agrees with Dr. Squibb's, it takes away from it the question of who is to do the inviting. The American Medical Association will probably be the body to invite, because they meet first. If we should happen to meet first we could invite them.

MR. SARGENT.—I supposed there was no question as to whether we would co-operate in this work. We have co-operated, and I see no reason for such a resolution. I supposed the question was how the revision should be accomplished; what sort of committees should do the work, who should appoint them, what they should consist of? I supposed also that the convention was self-continuing; that the convention which met before would continue until the next revision; and then that some members of that committee, or its chairman, would call the new convention. It has that power.

DR. SQUIBB.—At the present time.

MR SARGENT —Under this arrangement I do not see why that convention will not necessarily meet, unless by concession and agreement the two Associations conclude it is not wise for them to meet. I came here with a plan based on the old plan, that is, the convention to meet as usual, and appoint a mixed committee to carry on the revision and publish the book. I thought that would avoid all feeling, and at the same time bring about the coming revision in as perfect a manner as we might expect to get in any other way. It would only be necessary to appoint a double committee; two committees on revision, one to consist of physicians, to whom power should be delegated to name what remedies should go into the book, with as many details as they choose to add, such as the strength and form of the preparation; the other committee to consist of the apothecaries and pharmacists and chemists, who should construct the formulas, the second committee submitting their work to the first committee, and then the joint committee being the committee to do the work of publication. But in many respects I like Dr. Squibb's proposition better than mine. However, if the old convention is still in existence and cannot be wiped out, we might compromise on some such plan. I believe that the old system is to have the convention made up of representatives of the pharmaceutical and medical incorporated bodies, and it seems to me a very good way to get at that part of it. Bodies that are incorporated are supposed to have a legal existence, while, as Dr. Squibb has put it, we have not. We are a body as long as we choose to be a body, and if we choose we can stop. We have no legal status. For that reason I had thought this division of the committees would answer all the purpose, and remove everything like collision, and perhaps the work would be better done than it has ever been done.

DR. SQUIBB.—One point I would like indulgence to make, that has occurred to me since Mr. Sargent mentioned to me this plan, which did not strike me unfavorably at the time he mentioned it to me. If such a plan as that was attempted to be carried out we should have this condition of things. The physician would say we want a certain compound to make a cathartic pill. The physician having decided what their adjuvants are, the pharmacist would have to be instructed in therapeutics to know the value of the different ingredients that go into the compound. If a new compound was to be adopted, the pharmacist would be a bad judge of the proportions in which the ingredients were to be used; if simples were introduced the pharmacist would not be needed, so that position would not be quite as good as we thought. We should duplicate the organization, and there would be necessarily clashing in regard to the combined effect of therapeutic remedies.

Mr. Dohme.—The two national associations not only represent the incorporated medical State associations and pharmaceutical associations all over the country, but also the leading physicians and pharmacists in parts of the country where such associations do not exist. We know the present plan has not proved a successful one, for the reason that the members of the committees had not easy access to each other; it involved considerable expense to meet, and the meetings were not often enough to decide the questions that would come before them. Whereas, if this plan was adopted, and proper men selected to do the work, I think decidedly better work would be done.

Dr. Squibb.—I had a long conversation, spending an entire evening, with Dr. Carson, President of the present Pharmacopœia Convention, and whose duty it will be in 1879 to issue a call. In his judgment and mine there were two ways whereby the difficulty might be met. He perfectly accepts the position as it is now being discussed and was at the American Medical Association. He says there are two ways which would relieve him if he should be alive at that time, which he does not expect, and his condition of health is such as to make it doubtful. He has disease of the heart, and may follow his brother's example at any time, I am sorry to say, for he is an admirable man. If he is not alive the Vice-President of the convention has to issue the call. If neither be alive, the Secretary is to issue the call. Now he says this body and the American Medical Association may refer the matter back to their incorporated bodies, have the incorporated bodies notified of this change that is contemplated, and let them send their delegates to these bodies prepared to meet the issue which may arise when this and the Medical Association next meet. If the delegates come to these societies instructed to meet the issues that are likely to come up, then, he being so notified will not call the Pharmacopœia Convention. Another way he suggests is, that these bodies take the matter up and pursue it, although they may not so notify him; in the absence of instructions from the incorporated bodies, he will call the convention, and nobody need go. It would involve the necessity of his going to the convention and finding no delegates there, going home again. Of course the manner which would be most acceptable to him and to me would be for the delegates from these incorporated organizations to come into the national associations two years hence, fully prepared and instructed by their incorporated bodies to act as the American Medical Association and the American Pharmaceutical Association may deem best.

Mr. Sargent.—Was not this convention originally authorized by act of Congress?

Dr. Squibb.—It is a self-constituted body.

Mr. Sargent.—Why is it not altogether proper, and why might it not be done, that Congress should authorize a board of trustees for such a purpose?

Dr. Squibb.—It would not be desirable.

MR. SARGENT.—The Surgeon-General of the Army and Navy, and perhaps two or three well-known persons, might be made a board of trustees that would continue themselves.

MR. COLCORD.—That would be worse still.

MR. SARGENT.—The advantage which I would see in it would be that we should have a legalized Pharmacopœia. There is a possibility of having three or four of them got up by individuals. We should have one legal Pharmacopœia which everybody was obliged to follow.

DR. SQUIBB.—It would not take away the right from anybody to make a Pharmacopœia This is a free country, and any man practicing medicine, whether he was authorized or not, could make a Pharmacopœia.

MR. HANCOCK.—We have the resolution of Dr. Squibb, which he proposes shall lay over until next year. The Committee on the Pharmacopœia submit a preamble and resolution which they desire to be acted upon at this time. It occurs to me it is highly important that the members think soberly on this subject; and for us to adopt any resolution at this time I feel would be injudicious. This question is one of great importance to us; one that none of us have, and I believe that Dr. Squibb will acknowledge that he has not, thoroughly digested. It is something his mind is still pondering upon. He may next year reach a conclusion that he has not yet reached. Therefore I do not exactly like the tone of the amendment offered by the Committee on the Pharmacopœia. It exhibits a pride which is not commendable; that we will meet the physicians and work with them, but we are too proud ourselves to let them invite us. We don't feel that we should invite them, but we will consent to act with them if they require it. The physicians, as Dr. Squibb stated, originally had entire control of this matter, and the first Pharmacopœia of 1820 was about as good a Pharmacopœia, then issued by the physicians entirely, as the last Pharmacopœia issued by the physicians and pharmacists. Now the physicians are to be regarded as the front of medical science. I like very much the idea that has been suggested, that we are a specialty of the medical profession; that we are intimately identified with the medical profession, and that we wish to unite our effort with them. I am very much pleased with his chastisement of those who seem to think the physicians are very ignorant, and we are very wise. That is altogether too bad taste, and it is too frequently heard in pharmaceutical meetings. We have in the medical profession a great many men who don't think except to make as much money as possible; who will take any recommendation that comes along, and are as quick to give an elixir as a legitimate fluid extract, if they happen to think somebody has recommended it as better than something else; but we have in the medical profession some excellent men, possessing all the qualities that adorn the gentleman and scholar, and we should not cast these slurs upon a profession so honorable and so intelligent. This question we should consider, and should admit that the physicians should be acknowledged as the parties for whom the remedies are prepared. It is for their use that the Pharmacopœia has been compiled, simply as a guidance to the apothecary to supply the physician with the legitimate preparations, something he can use with certainty, and it is nothing more than right that they should request of the apothecary to put into proper shape, galenical and chemical, those articles which they desire to use in their prescriptions. One question has arisen in my mind that has not been cleared by any gentleman that has spoken. This Association has not been incorporated, nor has the Medical Association. There is one imperfection in our Pharmacopœia. That is, it is not sufficiently an authority; the parties who use it are not compelled to hold to their standard, and there is no penalty attached to the abuse of that standard. I think we ought to look to legislation to have these preparations made legitimate, and that those who issue preparations that are not legitimately made according to the officinal standards should be held strictly responsible for the offence. If the work is done by the American Medical Association, assisted by this Association, I cannot see how it can be better done than by this system. The general tenor of the remarks seems to indicate that these gentlemen who have held this position are getting old and will soon die, and nobody will be here to take their places; that another body will have to be constituted; that it is a tenure of life office. If the convention was properly framed from the properly organized associations, medical and pharmaceutical—those that are incorporated—I do not see why we cannot have it as thoroughly national as we can have it through these national bodies, and have it more authoritative, from the fact that they are organized and incorporated associations, and have authority by law which these associations cannot claim. I hope, in conclusion, that the members will not think of adopting any resolution at this time bearing on the subject, but the question will be left an open one to think upon and dream upon. If we have it thoroughly digested at the next meeting we can act intelligently.

Mr. Bedford.—This discussion has come up through the introduction of the resolution. Had the resolution offered by Dr. Squibb been worded as we now understand he means it, the resolution of the committee would not have been offered. What are we to do? I think it is legitimate and proper, and now is the time to say whether we shall do anything at all about it or not. I think it is right and proper that we should say, what the resolution I offered conveys, that is, our willingness to co-operate with the American Medical Association in the work of the revision of the Pharmacopœia, and stop there. This preamble and resolution will go on the minutes. It is expected it will go before the Medical Association as part of our discussion of the matter, and if we take any action we shall show a spirit of meeting them. A resolution, therefore, would be proper to act upon at this time, that this Association will willingly co-operate with the American Medical Association in the work of revising the Pharmacopœia.

Dr. Squibb.—The object of my resolution was not to act this year, but to discuss it with a view to more mature action next year.

Mr. Bedford.—I understand that now, but it was not understood before, and the committee had a meeting and proposed this other resolution Both resolutions go on the minutes as part of the proceedings. Therefore I suggest it would be perfectly proper and right to act upon such a resolution as I offered now.

Mr. Hancock.—If I understand this amendment it is rather to ignore a subordination on the part of this Association, which the resolution seems to convey. That is what struck my mind. I had an objection to it when I heard the resolution read, but there must be subordination on one side or the other, and shall we subordinate the medical to the pharmaceutical, or shall we acknowledge that they may take the lead and request us to co-operate? If the resolution is laid over just as it is now, we have the privilege of amending the resolution at the next session of this Association, and it might be much better amended than any amendment that could be offered now.

MR. BEDFORD.—I think there is no subordination on either side. The only point is, the American Medical Association have discussed this matter—

DR. SQUIBB.—No; they have not discussed it. They have appointed a time to discuss it.

MR. BEDFORD.—It has been discussed as we have discussed it here.

DR. SQUIBB.—Remarks were made by me alone on the subject, but there was no discussion. They appointed a time to discuss it, when I am to be present and give it as it lies in my mind. It has been presented, and laid over a year to be discussed at the next meeting. What I proposed was we should do the same thing.

MR. BEDFORD.—I think in the condition of affairs, two resolutions having been introduced, it is no more than right and proper that we should act upon something or other.

DR. SQUIBB.—Any members whose minds are made up, and who are sure they are right, can vote. Mine is not, and I cannot vote.

MR. COLCORD.—I was thinking that the best way to dispose of this subject as it is now would be to place Dr. Squibb's resolution on file, and pass Mr. Bedford's resolution.

MR. EBERLE.—Have we any knowledge here as an Association that we either are or will be invited by the Medical Association to co-operate with them?

DR. SQUIBB.—No; therefore I don't want to pass the resolution.

MR. EBERLE.—Therefore, though Dr. Squibb thinks we are doing just what the Medical Association has done, I discover a difference; that is, that the Medical Association did not offer a resolution that they were willing to co-operate with the American Pharmaceutical Association, but they have determined upon the revision of the Pharmacopœia, and this Association, without any invitation, expresses its willingness to co-operate with them without knowing whether it will be asked or not. The physicians are about giving a party, and have extended us no invitation, and we propose to invite ourselves.

DR. SQUIBB.—The position of the subject as it lies before the Medical Association is, this plan has been presented to them as a feasible one; and in this plan two members from this Association are contemplated, and so far as the Medical Association goes, it has accepted that plan for consideration next year, and I am ordered to be present at the Detroit meeting next year, to present this matter, matured as it may be by myself and the President of that Association for discussion.

Mr. Eberle.—We are certain of being received?

Dr. Squibb.—We are certain of being received, but I would not offer co-operation until I was asked.

Mr. Sargent.—It seems to me we had better invite them to co-operate with us. If we adopt the resolution, it looks like asking them for an invitation to co-operate with them.

Mr. Shinn.—I think, with Mr. Hancock, a little more deliberation will be of use to us. I don't think we will lose anything by leaving the discussion of this matter until another year, and having time to think it over. So far as the two resolutions are concerned, we can leave them both upon the same basis, that they have been presented to think upon and not to act upon.

Mr. Hancock.—If we act upon the amendment, offering our services, we would, I feel, commit ourselves to the plan; but by considering this resolution we have not committed ourselves to anything. The question is entirely an open one for us to act upon at the next meeting.

Mr. Bedford.—Then the whole matter comes up in a new light from what it appeared at the close of the last session. The resolution was offered, and was to be brought up at the next session for discussion.

Dr. Squibb.—But not for adoption.

Mr. Bedford.—Everybody supposed there would be some action, and until after the committee's resolution was read by Dr. Judge it was supposed that action would be sought.

Dr Squibb.—There was not time, when I read the resolution, to debate anything.

Mr. Bedford.—For that reason the committee prepared the resolution in a way they would not now do. We are all seeing the matter in a new light. I do not press my resolution. I offered it in the view that something would be necessary.

A Member.—Cannot the committee withdraw their resolution and let Dr. Squibb's resolution lay over until next year?

Dr. Squibb.—They don't wish to do that; they want to pass it.

The same Member.—I think it will be better to withdraw it, and let Dr. Squibb's resolution lay over until next year.

Mr. Eberle.—Why not receive this as a suggestion from Dr. Squibb, and not as a resolution?

Dr. Squibb.—It is in the form of a suggestion until it is passed. It is not a resolution until the society chooses to make it so, but it has to be introduced as a resolution to get it before us in a form that is parliamentary.

Mr. Sargent.—I move to lay the subject on the table.

Mr. Shinn.—I second the motion, to lay the subject on the table.

Mr. Judge (read the resolutions offered by Dr. Squibb, and said): The committee were of the opinion, from this wording, that it was Dr. Squibb's intention that these resolutions should pass at this session.

Dr. Squibb.—I admit the view was a perfectly natural one; yet there was no idea on my mind of having them forced to an issue now.

Mr. Moore.—I wish to make a few remarks, perhaps explanatory. There has been some allusion made to the fact of the physicians being ignorant. I, like Dr. Squibb, have the fortune to meet both sides, and, as he says, there are accusations there of ignorance on our part. I started out with the assertion that the medical profession should have the right to say what the Materia Medica should be because they are the only ones who are capable of judging, but I said when they come to the manufacture of the articles in the Pharmacopœia, they are ignorant of it and ought not to touch it. I meant that there are certain points upon which they are ignorant. I have never accused them of dishonesty in prescribing substances they know nothing about.

Mr. Sargent's motion, to lay the subject upon the table, was then agreed to.

Mr. Eberbach read the report of the Committee on Adulterations and Sophistications (page 403), which, on motion of Mr. Roberts, was accepted and referred for publication.

Mr. Rice.—I notice the report says tartrate of calcium and sulphate of potassium (page 409). Should it not be sulphate of calcium and tartrate of potassium?

Mr. Eberbach.—I have taken these from some of the essays of the graduating class of the Michigan University.

Dr. Squibb.—In regard to the officinal citrate of iron and quinia, I think there is a mistake in the paper. It states that the officinal salt yields 14 per cent. of the quinia (page 409). I think it is between 11 and 12. Much depends, however, upon the drying of the preparation.

Mr. Eberbach.—The Dispensatory claims for it 16 per cent.; but the standard preparation mentioned was made by the party who made the examinations.

Dr. Squibb.—Then if it was not dried to as great an extent, it ought to yield between 11 and 12 per cent. of the alkaloid.

Mr. Berrian.—Has the percentage of quinidia been ascertained? A short time since I found sulphate of cinchonia in a sample of sulphate of quinia.

Mr. Markoe.—One article spoken of by the reporter, commercial black antimony (page 415), I became quite interested in a short time ago. I had occasion to make a solution of chloride of antimony for a druggist in Boston, and ordered a sufficient quantity of the black sulphide of antimony for the purpose. On adding the muriatic acid to it, I noticed at once a brisk effervescence, which was not sulphuretted hydrogen. Thinking it might be due to the presence of limestone, I kept on adding the acid until all the effervescence ceased. That led to an examination, and I found that the sample was nothing more nor less than equal parts of ground marble and anthracite coal. Becoming interested in the matter, I went through the Boston wholesale stores and obtained samples; interested also a number of my pharmaceutical friends, Sheppard, Bradford, and others, and we organized to have a complete report of the Boston drug market on the black antimony. That formed the subject of one of the meetings of the Massachusetts College. The result was that every drug house in Boston, with one exception, was selling this article when black antimony was called for. In one store the question was asked me, whether I wanted the pure or the common. I said I wanted black antimony. "Well," he said, "we have two kinds; we have one we charge 8 cents and another we charge 20 cents a pound for, and that is the pure, from Powers & Weightman." Another concern offered the only kind they had at 12 cents, which they said was the crude powdered ore, not the refined. The result of the various reports made by our friends in Boston was that the majority of the samples pretty nearly corresponded in composition with the material I spoke of. I looked up the matter a little more thoroughly, and I think it is only fair to give the benefit of the advertisement to the parties who systematically send out this material to flood the country. The answers given by the wholesale druggists were that they knew it was a poor thing, because the price at which they bought it would preclude its being genuine. They excused themselves by saying, if they received an order from a horse-doctor for black antimony and sent the pure black sulphide, which they would have to charge 20 to 25 cents a pound for, it would be immediately returned. That don't go a great ways. I made the point that if they candidly told their customers what it was, I didn't think they would be willing to pay as much money as that for it. At all events, we ventilated the matter thoroughly. I found all the samples came from one house, Messrs. Hillyer & Son, of the Jersey City mills; and on looking at their price-list, I found they gave quotations for three kinds, first in the list being the refined sulphate of antimony, as they call it, and quoted at 15 to 17 cents a pound, as to quantity; the next grade being the powdered ore, quoted at from 10 to 12 cents a pound; the third, antimony, black sulphide, commercial, 2½ to 2¾ cents per pound. That article which is sold by them at 2½ to 2¾ is nothing more nor less than powdered marble and anthracite coal. I noticed, in one of the reports from Ann Arbor, the matter came up there, and the analyst reported it was adulterated with charcoal. I think that was a mistake, because that would be too light, whereas powdered anthracite passes muster very well, being quite dense and hardly to be detected by one who don't handle the material very often.

THE PRESIDENT. In our section of the country they use black lead instead of coal.

MR. ROBBINS. The article of black sulphide of antimony, or, as we call it, sulphuret of antimony, we attach very little importance to. I think the respectable druggists sell little of it. We find in our business that there is not a great deal of the cheaper article sold among the more respectable druggists. I don't think it is sold unless it is called for. The most easy and most general adulteration is marble and black lead. It is, however, easily detected.

I did not calculate to speak at all in this convention, and came here as a matter of interest and to see my friends. I have listened to the remarks about Messrs. Hillyer & Sons. As a general rule I do not believe in the introduction of names into these explanations. Mr. Markoe has seen fit to do it, and he is perfectly authorized to do it. In a recent meeting in New York this thing was discussed, and a name brought forward prominently, and the propriety of it was questioned at the time. I listened to that report on the adulteration of drugs, and of course I think it is very unimportant, because it does not go at all into the gist of the matter. A great deal of it is very stale, and there is no new information about it. The reporter spoke about approximate analysis of cinchona. Just think of that. I have here an analysis of every quinine which has been presented in the American market, giving the amount of water and of foreign matter. We cannot, in doing business, rely on anything that we call approximate analysis, and when a man talks about approximate analysis of cinchona bark, I consider he could have made no analysis at all. I make this remark because in our journals many analyses have been published as the work of students; with all due respect, as complete a lot of trash as ever was published. That is a good deal to say, but it is so, because there does not exist in our colleges of pharmacy the education, the resources, or the experience to make a proper analysis. Hoffmann, of Berlin, says no man is competent to make an analysis, especially that kind of an analysis, unless he has been especially trained for it, and unless he is an expert. Then of what value are those analyses which appear in our journals from time to time; the analyses of mere boys, mere students, without any experience, and who never have had, because they cannot get, in the present state of pharmacy in our country, the instruction that is required to make an analysis. I make these remarks because it has been the practice to couple with these analyses the names of highly respectable houses. I never mind being called to account, but I want to know who is my judge, what is his integrity, and what is his competency. Now, I shall say nothing of the integrity of these parties, but of their competency I do. They are thoroughly incompetent. We must have something more than approximate analysis; we must have a positive analysis; and there can be no subject more difficult than this matter of analytical chemistry. There is no subject more abused, and the trouble is that the reputations of men are being abused with it. I have analyses of all the varieties of quinine, all the fluid extracts, all the pills in the market, and all the preparations, and at the risk of giving a little offence I will give you some information. We had the fluid extracts analyzed, and so different have been these analyses with the most competent men we have, that we place no sort of dependence on any of these published analyses at the hands of our students under the direction of our professors. We took up nux vomica, and found Dr. Squibb's ranked five or six; we took up hyoscyamus, and Dr. Squibb's fluid extract was worth more than the extract of Lazelle, Marsh & Gardiner, and double that of McKesson & Robbins. You see the importance of analyzation. We must be continually revising ours. To say that a man was a man of integrity used to sell a bill of drugs, but a man must be known today to be a man of integrity, and also of competency, and there is no subject in which we are as deficient as in this very subject. We have a great deal to learn, a great ways to advance. We are not specialists in any direction.

I have given you these few ideas in a general way. The business of the druggist is conducted honorably, but there is a sad want of intelligence, and this Association is organized for the promotion of education and intelligence. It has done a vast work in the country, and I confess my obligation to it; but it will excuse me when I say I do think it is wonderfully deficient.

PROF. SHARPLES.—The gentleman, in speaking of proximate analysis, has misunderstood the terms used in chemistry. By proximate analysis is by no means an approximate analysis, but the term is used to distinguish it from ultimate analysis of an organic body. The latter will show the amount of carbon, nitrogen, and hydrogen. The proximate analysis of a body like cinchona bark will show the amount of quinia, quinidia, etc. It is only a separation of the proximate principles of that body, and is by no means to be confounded with an approximation to the truth. A proximate analysis may be just as true as any other.

DR. SQUIBB.—I think he meant by approximate a near analysis; he meant getting pretty near the thing that was stated. That is my position, so far as my examinations of drugs go, and it is all I aim at. I hope that Mr. Robbins will not frighten us all off from making our examinations, notwithstanding we may not make them absolutely correct. I do not believe that an accurate analysis is now important in pharmacy. I think an approximate analysis is all we need until we can learn to make it nearer. An assay of cinchona bark is one of the most difficult things to undertake; that and of opium are given with a freedom that I am shocked at very often, when I remember the difficulties I have, and when I see the flippancy with which they are sent out to the world, I agree in a measure with Mr. Robbins; but I don't agree with him in the necessity of an accurate analysis. If I can get within a quarter of one per cent. of the assay of cinchona bark, and can separate the valuable alkaloids, I am satisfied for my own purposes, although I may not be satisfied to publish it. I don't want the idea to gain ascendency in this body that we are not to make examinations of our materials because we cannot do it with accuracy.

MR. ROBBINS.—I know Prof. Sharples is technically right. I use the word approximate because I don't think of any other. I have no objection to this sort of analyses that are being made in the schools. They are in the schools like a great many things we have in business for ascertaining the purity of goods, which are not correct in themselves, but approach correctness. I do not object to an approximate analysis, but I do object that these shall be put out before the public as actual analyses, involving the reputation of respectable firms, and spread over this country and over Europe, when they are not correct, and we know it. I look upon the schools of pharmacy, or anything that savors of education, as sacred, and upon teachers in every form as sacred. I look upon it as a very great and high trust to be exercised; so I denounce these things, not because I have any interest in them *pro* or *con*, but because I don't believe in them. I believe the great evil we have got to contend with in our business is just ignorance, and nothing else. If we can only instruct our customers we are safe. If we can instruct in our schools of pharmacy we are on the right track.

MR. SHARPLES.—In speaking, as I did, in relation to proximate analysis, I should have said further, I agree most heartily with Mr. Robbins in what he has said about the careless way in which analyses have been made and published. I have had a great deal to do with making analyses, and I have attended to them thoroughly and conscientiously, testing in every way I know how. Now, I am brought continually into contact with just that kind of work Mr. Robbins has spoken of, and I am glad he has spoken in the way he has, for it is a disgrace not only to pharmacy, but to chemistry, to see the careless way in which analyses of difficult preparations are made and published as authentic facts, when I know that many of those articles, if I should study for six months, with all the knowledge I have, I should not consider myself competent to undertake. As a single instance, and a case that has been brought up continually before the Association, I will mention the determination of quinine. A year or two ago I had occasion to examine into the subject. I wished to make some correct determinations, and in the first place I did as I always strive to do. I sent to Powers & Weightman for some pure quinine to work upon. I took that quinine, and could detect no impurities in it by the qualitative tests as given, and undertook to make a quantitative determination. I believe my highest results were not over sixty per cent. I knew they were all wrong. I worked at it for a month, and never satisfied myself in that time that I could make a determination of quinine; and I should not want to make one to-day, and go into court and swear to it as being a perfectly accurate analysis.

The Business Committee moved, that a committee of three be appointed to consider and report on the time and place of the next annual meeting. Carried.

The President appointed the following committees:

On the President's Address and the Reports of the Executive Committee and Permanent Secretary, Messrs. Paul Balluff, New York; John C. Wharton, Nashville, and E. H. Sargent, Chicago.

On the Exhibits at the Centennial, Messrs. J. P. Remington, James T. Shinn, and A. W. Miller, of Philadelphia; J. F. Judge, of Cincinnati; William Saunders, of London, Ont.; S. P. Sharples, of Boston; A. P. Sharp and J. F. Hancock, of Baltimore, and Emlen Painter, of San Francisco.

On Metric Weights and Measures, Messrs. E. S. Wayne, Cincinnati; J. F. Moore, Baltimore, and I. J. Grahame, Philadelphia.

On time and place of next Annual Meeting, Messrs. S. M. Colcord, Boston; James T. Shinn, Philadelphia, and J. F. Hancock, Baltimore.

The Association then adjourned to half-past eight o'clock.

Fourth Session.—Thursday Evening, September 14th.

The Association met at the appointed time, President Bullock in the chair. The minutes of the second and third sessions were read and approved.

The report of the Committee on By-laws, presented at the second session (see page 600) was taken up from the table for consideration, and, on motion of Mr. Sheppard, accepted.

Mr. Babcock.—The amendment proposed by Professor Bedford at the last meeting is by this report virtually referred back to the Association. They do not recommend any action, but I understand we must still vote upon it, and vote no.

The Secretary.—It is unnecessary, unless the amendment be renewed, because the whole matter was referred to the committee for report, and they do not propose any change except in Article vi.

Mr. Babcock.—I judged so, from the statement that they would prefer to leave it to the judgment of the Association.

The Secretary.—They would prefer, but they argue against its adoption.

Mr. Babcock.—Then no action is necessary. I notice it was stated last year, at the time this amendment was brought up, that it was the intention of the movers of the amendment which admitted "teachers of pharmacy, chemistry, and botany, who may be specially interested in pharmacy," to have this apply solely to teachers in colleges of pharmacy. I observe also that this report of the committee states: "The proposed change is in accord with the constitution of the Association." In looking the matter up in the Proceedings for 1867, when this amendment was proposed and carried, in order to see whether that statement was correct, I find the matter was at that time referred to a committee, of which Dr. Squibb was chairman. They reported the amendment to the constitution which makes the constitution read as it now does, with a preamble which puts an entirely different construction upon the matter from that which is implied in this report of the committee. Dr. Squibb reported:

"Whereas, The constitution now contains no provision for the membership of those teachers of pharmacy and chemistry who, as lecturers in the various colleges of pharmacy, or as teachers in any way, have a close interest in the objects and designs of the Association, therefore

"*Resolved*," etc.

And then follows the amendment, which was carried. This would seem to show it was not the intention of the Association to confine the membership to teachers in colleges of pharmacy, but it meant teachers of those branches in any institution. I make this correction because it was stated that it was the express intention of the movers of this amendment to have it apply to colleges of pharmacy, and because it is also so stated in this report.

The President.—As chairman of that committee, I might make a remark. Mr. Babcock is right in substance, and yet I think wrong in matter of fact. The report says it seems to be in accord with the constitution. The amendment of Dr. Squibb was to the by-laws, and not to the constitution, while the paragraph of the committee's report refers entirely to the constitution. It says the proposed change of Mr. Bedford is in accord with the constitution.

Mr. Babcock.—This preamble by Dr. Squibb expressly states it is not in accordance with the constitution, because it says the constitution contains no provision.

The Secretary.—Mr. Babcock does not remember that at that time we had only a constitution, and the provisions of the constitution were afterwards made into by-laws and a separate constitution adopted. So the committee are correct in saying "it seems to be in accord with the present constitution." Dr. Squibb was also correct at that time, when we had only a constitution and no separate by-laws.

Mr. Babcock.—The present constitution was made from the other?

The Secretary.—Essentially.

The President.—The article to which the report refers is the first of the present constitution: "This Association shall be called the American Pharmaceutical Association. Its aims shall be to unite the educated and reputable pharmacists and druggists of the United States." So it refers, then, only to those who are actually engaged in pharmacy and in the sale of drugs.

Mr. Wharton.—The proposed wording of Article xi, I think, might be rendered a little plainer. It is said, "The Committee on Prize Essays shall, within six months after the annual meeting at which the essays are presented, determine which, or any of them, has met the requirements of the founder of the prize." I would suggest in lieu of that, "which, *if* any of them has met," etc.

The Secretary.—I move that Article i, Chapter vi, of the By-laws be amended so as to read, "There shall be elected annually six standing committees,—an Executive Committee, a Committee on Drug Market, each to consist of five members; a Committee on Papers and Queries, a Business Committee, a Committee on Prize Essays, and a Committee on Legislation, each to consist of three members."

The amendment to Article i, Chapter vi, was adopted in the form proposed.

The Secretary.—I move that Article xi be added to Chapter vi, and that it read: "The Committee on Prize Essays shall, within six months after the annual meeting at which the essays are presented, determine which, if any of them, has met the requirements of the founder of the prize. In all other respects they shall be governed by the stipulations expressed by the donor. The decision of the committee may be published in the journals of pharmacy in advance of the annual meeting of the Association."

Mr. Sargent.—I suppose it is competent for the Association to add to this amendment. I would suggest that the addition be made, that where no essay shall be presented which is considered worthy of the prize, that the sum which would be otherwise given shall be added to the principal, so that the principal shall accumulate in the absence of a worthy essay, and make the prize more valuable in the future.

THE PRESIDENT.—We have as yet one prize, and the rule which is laid down by the donor states that, in the event that no essay is offered which shall be thought worthy of the prize, the sum shall be added to the principal.

MR. SARGENT.—I had an impression that was not in the original.

THE PRESIDENT.—That was in Mr. Ebert's original letter founding the prize.

MR. SARGENT.—Might it not be well, as we are changing, to make this apply to future donations of this sort?

MR. SHINN.—The donor of any future prize might give directions that would be in conflict with this.

THE SECRETARY.—I think this covers it: "In all other respects they shall be governed by the stipulations expressed by the donor."

MR. VOGELBACH.—I move to strike out the word "may" and insert "shall." I think it is necessary that this decision be known before the regular meeting, if they are decided upon by the committee.

MR. WHARTON.—It is only a privilege that is granted to that committee. It is at their option to publish it or not, as they see fit.

MR. VOGELBACH.—I want to make it incumbent upon the committee.

MR. SHEPPARD.—In how many journals?

THE SECRETARY.—That question has very little importance in practice. I will state in a few words—it will not occupy the time of the Association more than a moment or two—how it has been done before. Whenever the committee decided, the matter was put in type, and then it was mailed to all the journals in the United States and Canada, so as to appear, in whole or part, in the numbers issued the same month.

MR. MARKOE.—There is one phase of this prize business which I think requires some remarks, and that is in regard to the way the prize is given. Now, it may happen, and I think it has happened already, that it has an influence to deter members from bringing forward contributions, if they know their contributions are going to be subjected to a rigid criticism, and the decision published in the different papers. I think the proper way to bestow that prize is that it is to be bestowed upon those who compete for it, and that the papers intending to compete for it shall distinctly make that application. I had rather some one else would have made this statement, because I don't want any one to think I competed for any prize. I was one of those who were mentioned as contributing something of value, but I had no idea of getting a prize for it. I worked on it, and got something I thought was new, but I did not expect any prize or to run the gauntlet. I think the papers that are intended to compete for the prize should distinctly state so, otherwise it will deter members from bringing in contributions.

THE SECRETARY.—The stipulation in the Ebert Prize carries the inference that every paper, whether in reply to a query or handed in as a volunteer paper, shall be considered as competing for the prize.*

MR. MARKOE.—I do not care anything about it, personally. I did not compete for any prize, but still some people do not like to have it put out that they tried for a prize and failed. The award that was made year before last, I believe, was for a distinctly competing paper. The gentleman upon whom the prize was bestowed distinctly stated that he put it in for the prize.

THE SECRETARY.—Mr. Markoe will remember all the other papers were likewise examined, and from the whole number two or three in addition were selected.

MR. MARKOE.—I did not know but those were distinctly put in competition.

THE SECRETARY.—No, sir; the other two were in answer to queries.

MR. SAUNDERS.—I think the object of this prize is to reward merit wherever we find it. If any of the members are too modest to receive this prize they can hand it back.

MR. BEDFORD.—The idea is that a person does not want his paper criticized or written about to his detriment.

THE SECRETARY.—I do not coincide with Messrs. Bedford and Markoe in this respect. I do not think it is any detriment to a person to receive such a notice. I say that, not because I was on the committee, but because it seems to me to receive a notice from a committee which has been appointed to criticize, that such a paper has been distinctly selected with the possibility that the prize might be awarded to it, that that in itself is a meritorious notice, and should be so considered.

MR. MOORE.—I do not see what the committee have to do with the publication of any man's name who does not receive the prize. The way is to examine them and decide who is to receive the prize, and so announce it, but make no announcement in regard to any one else.

MR. REMINGTON.—I do not know that I ought to say anything on this subject, but Markoe and myself are in the same boat. In my paper which I wrote for the Association, last year, I had no more expectation of receiving any notice from the Committee on the Ebert Prize than many of the members who merely answered their queries, and I must confess I was very much surprised to read the report of the committee published in the journals, although it may have been perfectly proper. I think it did put the gentlemen named in rather the position of having tried for the prize, and, having failed, and taking that view of it, it seems to me that the views of Mr. Moore ought to prevail, that, where it is not considered proper to award the Ebert Prize, nothing whatever should be published by your committee.

MR. WELLCOME.—I want to say a word upon the point of which Messrs. Markoe and Remington have spoken. I have heard remarks made by men who I think would present papers but for that very reason. They brought up in illustration the criticisms which occurred on these papers and they don't

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* See Proceedings, 1873, page 58.—EDITOR.

wish to put themselves on record in that way. They don't wish to be understood as competing for the prize. They brought up the illustration, suppose Dr. Squibb should write a paper without any special attention to the prize, and be criticized alongside of any young member with nothing like the experience of Dr. Squibb, but who would be criticized in comparison with him. A gentleman with whom I was conversing upon this subject said, in giving this illustration, that he would not put himself in that position, and he wished that some clause could be inserted in our by-laws which would make a provision for that, and that all papers in competition for this prize should be so mentioned.

The President.—As a member of this committee, I am glad to hear the remarks made in regard to it. This Committee on the Ebert Prize had nothing but the letter of Mr. Ebert founding the prize to guide them. They have done what they thought was the intention of Mr. Ebert, and in making the criticisms which they did it was done with a view of putting forth the various facts brought forth in these essays, so that the ground of the examination and award could best be seen by the members of the Association. There was no attempt at any unfair arrangement of the essays side by side, whatever; and if the members think that is not for the good of the Association they have only to express their views.

Mr. Remington.—I don't think any of the gentlemen who have spoken feel at all willing to accuse the committee of any unfairness whatever. I am very sure of that. I have no question at all that in any opinions which may have been expressed, or criticisms on the report of your committee, no imputation of unfairness on the part of the committee was intended or expressed. The opinion was expressed by some of the gentlemen who have spoken to me on the subject that no one ought to be placed in the position of being criticized by this committee publicly, in the pharmaceutical journals, when it was well known that they had not competed for the prize at all, and that the very best way, in their opinion, was not to mention the names of any of the gentlemen whose papers did not come up to the requirements of the committee.

The Secretary.—It seems to me future committees might fall into the same bad habit that the other committee did.

The President.—I am of the opinion, having been a member of the committee since the prize was established, that if it is your wish that such criticisms should not be made, you had better alter this article so as to prevent any future committee doing as we have done.

Mr. Sheppard.—Does not this stipulation cover the ground: "In all other respects they shall be governed by the stipulations expressed by the donor?"

The President.—I think not. The stipulations of Mr. Ebert do not say whether we shall or shall not publish any remarks whatever on the essays, or simply a line that the prize is awarded to So-and-so. The committee went over the essays carefully, and compared views upon them, and what they have done, was done in the interest of the Association for the advancement of information among you, and if you will be contented with the simple giving of the prize without any remarks in regard to the essays, it will certainly be a great saving of time to your committee.

Mr. Eberle.—Does not Mr. Ebert's letter determine that the papers presented shall be only those presented for competition?

Mr. Maisch.—It says, "for the best essay or written contribution."*

Mr. Vogelbach.—Then, if the committee sees fit to criticize one, two, three, or four essays, they can do so; but are they not bound to criticize every paper which is presented? If I understand the meaning of the donor, it is that every paper offered in answer to queries, and every voluntary essay is to compete, and in that case you have to criticize every paper. You may criticize the paper that wins. I don't suppose the happy man would object to that; but if you are going to make a criticism, you have no right to make a selection of three or four papers. I don't know as the committee have a rigbt to say who are competitors unless the writers announce themselves so.

Mr. Lincoln.—The proposed article says that the decision shall be published. It says nothing about the criticism of the committee, and I should not suppose the committee would go out of their way to criticize any of the papers. I think it is the intention of the article, that as to the successful competitor, his essay may be published in the journals.

The Secretary.—The committee were called upon to decide, and this very question came before it, as to how this decision should be published; the committee thought it was not more than fair to the meritorious papers that were contained in the same volume, that those should be mentioned, and reasons should be given why the committee selected a particular essay. If that is not desirable, all that is necessary is to amend that Article xi, as proposed, and say that criticisms shall absolutely be omitted.

Mr. Babcock.—To bring this matter to a focus and test the sense of the meeting, I move to add, after "determine," the following words: "and report without comment."

The President.—Would it not be better to say, "the decision of this committee may be published in the journals of pharmacy without comment."

Mr. Babcock.—That might apply, that the decision might be published without comment.

Mr. Sargent.—That would cut you off from commenting upon the winning essay.

The President.—Entirely. It would be simply saying that the Ebert Prize had been awarded to So-and-so.

Mr. Wharton.—You might add, without comment except upon the successful paper.

Mr. Sargent.—Would it not sound better to say that the successful paper shall be published with the comments of the committee. That would cut off others.

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* It is but proper to say that Mr. Ebert accepted these views of the committee during a correspondence in the early part of 1875.—Editor.

THE SECRETARY.—It will be published in the Proceedings, but you cannot direct that the journals shall publish it.

MR. SARGENT.—You don't care to. They will publish it without directions. I think, instead of saying that none should be commented upon but the winning essay, it would be better to say that the successful essay should be published with the comments of the committee thereon.

THE SECRETARY.—"The Committee on Prize Essays shall, within six months after the annual meeting at which the essays are presented, determine which, if any of them, has met the requirements of the founder of the prize. In all other respects they shall be governed by the stipulations expressed by the donor. The decision of the committee, with such comments upon the successful essay only as they may deem proper, may be published in the journals of pharmacy."

The new Article xi, Chapter vi of the By-laws, was adopted as read by the Secretary, and the proposed Article xii was then likewise adopted in the following form:

ARTICLE XII.—The Committee on Legislation shall keep a record of, and compile for reference, the enactments of the different States regulating the practice of pharmacy and the sale of medicines. They shall report to each stated meeting of the Association what legislation on the subject has occurred during the year.

Mr. J. D. Wells read a paper on senega root, in answer to Query 1, which was accepted and referred (see page 516).

MR. SHARPLES.—I have found senega growing quite abundantly through different parts of Chester County, where I know of several large patches of it. I don't know that this had ever been used as a source of commercial supply, but it has been extensively used as a source of local supply.

MR. MAISCH.—Senega grows in Lancaster, also, but so far as I know not sufficient to send it to market. It is quite common in the Virginia valley.

MR. SAUNDERS.—A few weeks ago I ordered a bag of senega root from New York, and received a very fine sample of root indeed, much larger than I had ever seen before, and not caring much about tasting senega root, I had it ground and made into fluid extract. The resulting extract had very much less strength than senega root usually has, and on referring to the United States Dispensatory, I found it stated that the virtues were in the cortical portions of the root, and that the centre was inert. Not liking the extract, I laid it aside for future consideration, and telegraphed for another bag by express. This second lot was very much like the first, except it was scarcely so large and yielded an extract a little stronger, but nothing like what we have used out there—the senega root from the West. I have samples here of the extract furnished from the senega root we usually get, and from these two bags. There were some points of difference that struck me as peculiar. There was almost an absence of that peculiar odor present in extract of senega, and in addition to that there was a strong fluorescence in the liquid, which, when the light was reflected on it, was of a quite green color; it looked so different that I was inclined to think it must be some different species. On writing to the parties they assured me it was one of the finest specimens they had ever seen, and they thought they were doing a great favor to me in sending it, as they were intending to ship it to Europe, where it brings a high price. My object is to have members avoid handsome samples of senega. It don't seem to have more than half the strength of the roots we usually get from the West. For my own part I don't want any more handsome samples. I prefer the smaller roots. I believe the strength would be more than twice as much. With the fluorescence it has the appearance of a sample of crude petroleum, when it is first distilled without decolorizing it. I leave these samples for inspection, and would like to hear from any of the members.

Mr. Maisch (examining the root).—I think this is a polygala, but I don't think it is senega.

Mr. Saunders.—That was my impression, but I didn't know any polygala that came so near to it. You will notice the almost absence of that peculiar gaultheria odor.

Mr. Bedford.—The remarks of Mr. Saunders coincide with some senega I saw recently reserved for shipment to Europe, and which was entirely wanting in senega strength.

Mr. Maisch (showing another root).—That is real senega. There is a sample, the finest and largest specimen I have ever seen. Mr. Jenks just now informed me that this specimen came from North Alabama.

Mr. Sharp.—A large amount of senega comes to Baltimore, and is exported from there. It comes principally from Southeastern Virginia and Tennessee. I had occasion to investigate the subject, and have traced up about 30,000 pounds received there; it is principally exported from Baltimore to Europe.

The Executive Committee presented the names of the following candidates for membership:

Connecticut.

W. A. Spalding, New Haven.

Indiana.

Jefferson S. Conner, New Albany.
Finley B. Pugh, Rushville.

Kentucky.

Francis Marion Gray, Hopkinsville.
John J. Reynolds, Louisville.

Maryland.

Charles Brack, Baltimore.
Henry Shriver, Cumberland.
Charles Thienemann, Baltimore.

Massachusetts.

Luther Lee Atwood, Pittsfield.
Frederick A. Hatch, Boston Highlands.
Thomas B. Nichols, Salem.

New York.

Joseph R. Bond, New York.
William F. Henes, New York.
Philip Krieger, Brooklyn.
E. Post, Athens.
George J. Seabury, New York.
George W. Snow, Syracuse.

George S. Wanier, New York.
Robert Wendler, Brooklyn.

Ohio.

Charles B. Johnson, Middletown.

Pennsylvania.

Wilbur F. Horn, Carlisle.
James J. Ottinger, Philadelphia.
S. W. W. Schaffle, Lewisburg.

Tennessee.

Julius Fahlen, Memphis.
James B. Haddox, Nashville.
William H. Wharton, Nashville.

Virginia.

Edward Burgess, Norfolk.
Ed. A. Craighill, Lynchburg.
Charles F. Underhill, Norfolk.

Messrs. A. P. Brown and William McIntyre, having been appointed tellers, reported the unanimous election of the candidates.

The following Queries were by request continued for another year: No. 2, on the Requisite Knowledge of Therapeutics, to B. T. Fairchild; No. 3, on Salicylic Acid, to R. V. Mattison; No. 4, on Spirit of Nitrous Ether, to P. W. Bedford; No. 5, on the Use of Fluid Extract of Licorice Root in connection with Solution of Alkaloids, to William McIntyre; and No. 7, on the Preparation of Decoctions, etc., from Fluid Extracts, to J. Henry Hancock.

A paper, by Henry N. Rittenhouse, on ammoniacal glycyrrhizin, was read and referred (see page 543). It was accompanied by a sample of the article in handsome scales, possessing a very sweet taste, and it was suggested that it might perhaps be useful in covering the bitter taste of quinia solutions.

Mr. Wharton.—I would like to inquire whether the admixture of licorice with quinine does not form an insoluble compound. My reason for thinking it does is that the article which was once sold extensively as sweet quinine, when dissolved with an acid, was bitter, but when left undissolved was sweet, and it professed to be a mixture of quinine with the sweet principle of licorice root, glycyrrhizin. This preparation, as I say, in the dry form was rather sweet. Its bitterness developed somewhat after being held in the mouth, but if it was dissolved in an acid its bitterness became apparent immediately.

Mr. Maisch.—That article was merely the alkaloid cinchonia mixed with glycyrrhizin, or else powdered licorice root, in sufficient quantity to mask the bitter taste of the cinchonia.

Mr. Wharton.—Does it not act in the same way with quinine?

Mr. Maisch.—The alkaloid quinia will require less licorice root than the sulphate, because that is more soluble.

Mr. Remington.—I think Mr. Maisch is mistaken. I think several samples were merely the alkaloid cinchonia, which was sweet quinine itself.[*]

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[*] According to American Journal of Pharmacy, 1869, p. 187, the article referred to claimed to be quinia, coated with glycyrrhizin; Prof. Procter found it to consist of three parts of cinchonia and one of impure glycyrrhizin (l. c., p. 304).—Editor.

On account of the insoluble character of the cinchonia, when it was taken into the mouth it produced little or no impression, but as soon as it came in contact with an acid, then a soluble salt was formed, which is bitter. That was the ostensible plea upon which sweet quinine obtained a sale at first; that it was quinine in which the bitter taste was masked with glycyrrhizin.

A paper was read by Mr. Kennedy in answer to Query 9, and giving a working formula for fluid extract of guarana (see page 491).

Dr. Pile read a paper on syrup of ferrous iodide, in answer to Query 8, reporting that he did not succeed in preserving this syrup by the addition of citric acid (see page 492).

MR. SHINN.—It would be interesting to have the views of the members in regard to the keeping of the syrup of ferrous iodide. My own practice has been to put it into one or two-ounce vials, and expose it to the light. It keeps until opened, and about one-half is taken out, when it begins to change color.

MR. EBERLE.—I have tried all sorts of ways. Sometimes I succeed, and then I do not. Sometimes the light seems to affect it, and other times not. It entirely depends upon its oxidation; but even under the same circumstances, after putting it up in small vials, a change will take place, when at other times there will be none.

MR. REMINGTON.—I have had good success by keeping it in two-ounce glass bottles, in a dark cupboard, and in each bottle a piece of iron wire.

MR. RICE.—I keep it in a one, or often, a five-gallon demijohn. I purify the syrup with white of egg. The color is pale green always.

MR. HANCOCK.—I would like to ask Dr. Pile how he manipulates his syrup; whether he uses the acid in solution?

DR. PILE.—The citric acid is dropped in after the syrup is finished.

MR. MARKOE.—I noticed that some writer in a pharmaceutical journal suggested the use of a syrup made from glucose, and claimed that a syrup thus made kept indefinitely. I would like to ask if any gentleman ever tried that process?

MR. MAISCH.—It is well known that when iodide of iron in solution was first introduced into medicine it was preserved by honey, and although I do not remember that I have ever made it, I certainly have seen a number of samples years ago, which were about as dark as an oxidized solution of ferrous iodide could possibly be, so I do not believe it is preserved by it.

MR. MARKOE.—In the case of honey you would have an imperfect saccharine solution. You would have a good many predisposing causes.

A MEMBER.—You might have deoxidizing agents there. It is the oxygen of the air that discolors the syrup.

MR. MAISCH.—I do not think that the use of honey would make a material difference from that of pure glucose.

Mr. Brown.—I have used glucose, but did not succeed. I always use citric acid, and have kept it some length of time without change.

Dr. Pile.—Was it in contact with air or kept from it?

Mr. Brown.—I had a bottle in my store for about six months half full, and it was just as good after that time as when first made.

Mr. Eberle.—My practice is, after careful preparation by the Pharmacopœia process, the syrup is placed in small bottles, fitted with corks and covered with skin. It constantly occurs that the surface will become changed, gradually passing through the whole preparation.

Mr. Hancock.—For four or five years I have been making the syrup of iodide of iron with this addition of five grains to the quantity of the officinal formula, and it has been a perfect success in my hands. I find, in making a solution of the acid, and adding it to the iodide of iron, that the reaction seems to be more perfect and a stronger union between the two. In using pint bottles I find no trouble with it at all, and have not had, the last used from the pint bottle having the pale green color characteristic of the syrup. In two or three instances I have found a slight change, but it occurred in the summertime when there seemed to be a good deal of electricity in the atmosphere, and although I cannot prove it, I am under the impression that ozone had something to do with it. I believe the presence of the acid intensifies the activity of the two combining elements.

Mr Painter.—My experience agrees with Mr. Shinn, that it can be invariably preserved without change in color by being exposed to the sunlight. My practice has been to put it in pound bottles and to dispense it therefrom, and when exposed to the sunlight it did not change even to the last ounce. If it is made a denser syrup than that of the Pharmacopœia I find it will keep better. In our climate (California) we are not troubled with much electricity in the atmosphere. I have found also that syrup of uncrystallizable sugar will preserve it longer upon the shelf than that made from the ordinary sugar. Sugar obtained from the factories where rock candy is made from fresh sugar will preserve the syrup a considerable length of time kept in the usual way on the shelf.

Mr. Kennedy.—I would like to ask if a change in the color of the syrup has been noticed when exposed to the rays of the sun. My own experience has been that there is a change from the greenish to quite a light color, the sun having a bleaching effect on it.

Mr. Painter.—The color does get lighter. My custom has been to make a number of pounds at a time in the winter and have it sealed up. It is not so prone to change after it has been there a month or more as it is if first opened.

Mr. Sharp.—We keep it in all sized bottles, large and small, and have not for years had any trouble with it. I have tried all kinds of sugar and rock candy, and it would change, but with the addition of a small quantity of citric acid it is preserved permanently.

Mr. Shinn.—You dispense from one of those bottles, and it keeps, exposed to the air?

MR. SHARP.—Yes, sir; exposed to the light and air.

MR. WHARTON.—From the conversation I have put together two things, which seem to be pretty unanimous; that is, one says that glucose will prevent the change in the iodide of iron; another says uncrystallizable sugar, which is very nearly the same thing. Perhaps the citric acid acts upon the sugar in a way to produce that uncrystallizable sugar. We know that tartaric acid added to saccharine matter will prevent its crystallization. Therefore the whole secret of success may lie in the fact that the crystallizing property of the sugar is broken up, and perhaps when the acid is not added, some hydriodic acid being formed in the process, it may change the sugar, and have the same effect.

MR. SARGENT.—Some time since Mr. Ebert, by accident, thought he had stumbled upon the fact that the presence of grape sugar tended to preserve the iodide of iron; he instituted experiments, using grape sugar in the purest form he could get, the ordinary glucose not being suited to the purpose, and his results tended to show that the presence of grape sugar, whether induced by the use of the acids or other means, would preserve the green color, not changing it as some of the syrups have been changed to a light color which involves probably as radical a change as the brown color. I presume he will report upon this, but he not being here I thought I would mention it.

No report having been received in answer to Query 10, on the Preparation and Advantages of Compressed Pills, it was dropped.

The Secretary read a report from Mr. J. U. Lloyd, in answer to Query 11, on Cotton-root Bark, pronouncing in favor of fresh over old bark. The paper was referred to the Executive Committee.

MR. WELLCOME.—The fluid extract of gossypium in the market is made altogether from the dry bark. Physicians, especially the specialists throughout the country, prescribe the fluid extract of cotton-root bark very extensively, and I have heard them remark that with the fluid extract from the same manufacturer they could not obtain the same results at different times. I believe that the dried bark varies. I have heard it suggested before that the dry bark did not have any therapeutic value, and have discussed it with physicians who have conducted experiments in regard to this, and who at times have had good results, yet at other times with the same manufacturer's extract did not get the same results. Can it be that the bark is not always properly dried?

MR. RICE.—I believe it was Mr. Maisch who drew attention to the fact that a great deal of cotton-root bark was in the market that was not gossypium bark at all; and I believe he made the remark that it was a species of cotton-wood.

MR. MAISCH.—I thought it was, but it was not the bark of Populus monilifera.

MR. RICE.—Likely some of these extracts of cotton-wood bark are not the true gossypium bark, owing to the fact that the collectors are ignorant people, who collect that which is known in their neighborhood as cotton-root bark.

MR. McINTYRE.—I do not see how I can harmonize the conclusions of the writer with the history of the introduction of this bark as a medicine. Neither have I ever seen it stated whether this infusion at first introduced was made with the fresh or dry bark. The introduction has been due to the effects of the infusion, and the writer eschews water altogether.

MR. JUDGE.—This article has got its reputation in the South. The negro women are represented as having dug the roots up and taken the bark, so it is settled that it was the green and not the dry.

MR. MAISCH.—In regard to the statement made by Mr. Rice I would say that Mr. Lloyd has for some years frequently corresponded with me upon this very subject, and repeatedly sent me samples of bark, and invariably the bark of which he sent me samples, and from which he failed to obtain a preparation which would answer his expectations, was cotton-root bark. He has informed me also of the difficulty he has occasionally experienced to obtain well-dried cotton-root bark; that is, bark which had been dried without moulding.

On motion, the Association adjourned until Saturday morning at 9 o'clock.

Fifth Session.—Saturday Morning, September 16th.

The Association was called to order by President Bullock at 9 o'clock. The minutes of the fourth session were read and approved.

The Chairman of the Business Committee introduced the following resolution:

Resolved, That the Executive Committee be instructed to carefully revise the proceedings of this meeting prior to publication, and to expunge therefrom every irrelevant word and every word containing any personal imputation.

MR. MENNINGER.—Mr. President, I hope this resolution will not prevail. Our minutes should be a correct transcript of all that transpires here. I appeal to the sense of justice of the members present that it would be highly improper to pass this resolution now, when the gentlemen whose remarks gave rise to its introduction are now absent and unable to defend their action. In my opinion any attempt to amend the record of the Proceedings by expunging a part therefrom, should have been made at the time of such discussion, and in the presence of the gentlemen who made the objectionable remarks.

MR. JUDGE.—I wish to call attention to the difference between discussions and minutes. We have a phonographic reporter to take down the discussions. The minutes are the actual proceedings of the body, and not the various discussions that arise upon those proceedings. There is a marked distinction between the two.

Mr. Colcord.—This is not the first time we have had trouble in this direction. Years ago the Secretary compiled the records. Then the Association formed an Executive Committee which was to take charge of the publication, and they were selected by the Nominating Committee. They were intended to be men that we could rely upon to say what should be published and what not. In addition to that we employed a phonographic reporter to take down everything that was said, and the Secretary was to record the minutes, so the Executive Committee should know exactly what was to be published. They had that discretionary power. Now it was suggested within a day or two that we should have a committee to say what papers should be put in, but it is the work of the Executive Committee, and we ought to have an Executive Committee that we can trust with that power; if we have not, I think a good many things are said here and reported accurately that ought not to be published, and the Executive Committee ought to have as much power as they need delegated to them for that purpose.

Mr. Sheppard.—This body has unquestionably the right to make its own rules. It has made its rules in the past in respect to what shall be printed in the Proceedings, and it is only just and right to every member who has taken a part in the discussions to consider that those rules are the rules of the Association up to such time as the Association chooses to change them. The question arises, is it just and right for us to take any retrospective action? We can say what shall go into the Proceedings in the future, although I should not be in favor of expunging much that has been said; but it does not seem to be right to go back and expunge anything that has been said up to this time. We should adopt such proceedings up to this hour as have been had.

Mr. Saundeas.—I for one, and I think I speak for many who come a long distance for the purpose of listening to scientific discussions upon matters connected with our profession, object to wasting so much time as has been wasted at this meeting on subjects foreign to any scientific body. I think if we could leave the matter in the hands of the Executive Committee to leave out everything of a business nature, except the report of the Nominating Committee, the election of members and officers, and the appointment of committees, it would tend to make our Proceedings much more interesting. I am sure there is not one man in fifty that reads the business proceedings as published in our Proceedings. Many come from a long distance, anxious to listen to matters of scientific interest, but do not like to see the time taken up with discussions upon these matters, which are of no interest to the body. I am sure if a resolution should be passed that nothing but scientific discussions should be published, it would be very satisfactory for most members of this Association.

Mr. Menninger.—I heartily agree in what the gentlemen say about the impropriety of bringing irrelevant matters here, but I appeal to the gentlemen here to do justice to the absent members. You can alter your rules to govern any proceedings hereafter, but I appeal to you it is highly unjust to amend your Proceedings or the manner of their publication, after may be one-half of the members that were present have gone out, in relation to matters that occurred at a previous meeting. I am as ready as any one to give the Business Committee the power to prepare the business, and then publish nothing but scientific discussion, but give us notice of what is to be done. Allusion has been made to the men that give the scientific papers. You all know that no man in this Association has given us more scientific papers, and labored more assiduously and industriously for our welfare than Dr. Squibb, and you all know that he has for years fought any attempt to patch up the Proceedings, or to amend or expunge any portion of them. He has continually demanded a publication letter for letter. Now when he is gone, having been called away from here by business engagements, I am very sorry to find a disposition to amend our Proceedings as they have already occurred. Make your rules as you please for the future. You have a right to do that, but pass no *ex post facto* law.

Mr. Scofield.—I have no objection to this discussion, provided it is not occupied by one or two continually. I am very happy to hear a discussion upon any subject that comes up here when it is generally discussed, but when it is monopolized by one or two, it is rather tedious. We all remember the old-fashioned wells where you turn a crank, and first one bucket comes up and then the other. The only difference is, whereas the buckets would come up full our orators come up empty. I want to ask whether it would not be satisfactory to both sides to have this matter referred to the Executive Committee without any instructions.

Mr. Colcord.—That is the way it is now.

Mr. Scofield.—It has worked well for the past. If there is no objection, I will move that it take that reference. I move that it be referred to the Executive Committee.

Mr. Maisch.—I have been chairman of the Executive Committee, and subsequently as Permanent Secretary, a member of that committee for many years. I must say that the Executive Committee always felt as if, under Article iv of Chapter vi, they had the right to leave out whatever in their opinion ought not to go in the Proceedings. That power has, however, been very rarely exercised, in a few exceptional cases only, although the Executive Committee thought much of the discussion should have been and might very properly be left out. The reason for this action was simply because the Association has never voted on the point when it came up for discussion; consequently if the Association does not take a vote on this resolution, the committee will act precisely the same as they have done; that is, publish nearly everything that has been said.

Mr. Peixotto.—I think the time has come when we should have a committee to revise our Constitution and By-laws, and in that way we can get over this matter. If we are going to waste all this morning in this discussion I think it ought to be decided right here.

Mr. Wellcome.—It seems to me that the discussions that have taken place ought to be reported in full, as there was no objection made to them at the time, and they were not ruled out of order; if they were competent then, I think they are competent to appear in our reports.

Mr. Hancock.—I second the amendment to refer it to the committee. There is no necessity for any action on the part of the Association. The Executive

Committee have expunged expressions which, if published, would do more harm than good, and they have the authority. I think when anything is irrelevant to the subject under discussion it ought to be expunged.

MR. ROBERTS.—The object of the resolution is to relieve the Executive Committee from undue responsibility, and put the responsibility where it rightfully belongs, to the Association.

The amendment of Mr. Scofield was put to a vote and lost, 18 members voting in the affirmative, and 40 in the negative.

Mr. Menninger raised the point of order, that the resolution of the Business Committee involved an amendment to the By-laws, and could, therefore, not be acted on without previous notice.

THE PRESIDENT.—The Chair decides that it falls within the scope of the Executive Committee under Article iv, which says: . . . . "together with such addresses, scientific papers, discussions, notices of new processes . . . . as the Executive Committee may deem worthy of insertion." I would rule that this comes within the clause "that they may deem worthy of insertion."

The question was taken on the original motion, and the votes being counted, 31 were announced to have been cast in favor and the same number in opposition.

MR. BEDFORD.—It seems unfair that the President should be called upon to decide a vote when there are so many persons present who did not vote at all.

MR. HANCOCK.—I agree with Mr. Bedford. We ought to take it again.

The vote being taken again, the resolution was carried by 51 ayes against 30 nays.

Mr. Eberle offered the following amendment to Chapter vii, Article x, of the By-laws:

A motion to expel a member shall be laid over to the session next succeeding that at which the motion is made.

The amendment lies over, under the rules, to a subsequent session.

The following report was read by Mr. Colcord:

The committee to select a place for our next meeting would report that they have received invitations from Cincinnati and from Canada, and, after considering the propositions, would recommend that the next meeting of the Association be held in Toronto, Ontario, on the first Tuesday (fourth day) of September, 1877, at 3 o'clock P.M.

SAMUEL M. COLCORD,
J. F. HANCOCK,
J. T. SHINN.

Mr. Judge.—I move that the report be accepted and the recommendation adopted.

Mr. Saunders.—I second the motion. The situation of Toronto is such as to induce a large number of members to be present. It is eighty miles from Niagara Falls, and it is always easy to get excursion tickets to Niagara Falls and return from any part of the United States. From there three hours' railway will bring you to Toronto, or the boat may be taken at Rochester across the lake. So it is a very accessible point. I am sure our Canadian friends will do all they can to make the occasion a pleasant one to the members of the Association.

Mr. Judge.—In this connection I will say I am authorized to extend an invitation to the Association to meet, in 1878, in Cincinnati.

Mr. Waugh.—As a Canadian, I hope this Association will adopt the views of our friend, Mr. Saunders. Toronto is one of the most centrally situated cities, and probably more convenient than many of the places where meetings of this Association have been held. The Canadians will be very happy to do all they can to receive the Association.

The motion was agreed to unanimously.

The Local Committee gave notice that an invitation had been received from the Pennsylvania Salt Company to visit their works located at Greenwich Point, and that a steamer would be in waiting at Walnut Street wharf on Tuesday morning, September 19th, at 9 o'clock. Notice was likewise given of the arrangements for the ladies' drive through the Park, the visit to the Zoological Garden, and the excursion to the Switchback on the following Monday, September 18th.

Mr. Shoemaker read the report of the Committee on Drug Market, which was accepted and referred for publication (see page 393).

The Secretary announced the death of Mr. F. S. Gaither, of Washington, and, on motion, the Executive Committee was empowered to incorporate into their report an obituary notice of the deceased (see page 585).

Mr. Diehl read the introductory portion to his report on the Progress of Pharmacy, the whole being, on motion, accepted and referred for publication (see page 25).

Mr. E. Scheffer read a paper on Lactopeptin, in answer to Query 32 (see page 546); also a volunteer paper on Pancreatin, Diastase, and Ptyalin (see page 551), both being referred to the Executive Committee.

Mr. Colcord.—Has Professor Scheffer, in making his examinations, made the article of lactopeptin as they purport to make it?

MR. SCHEFFER.—No, sir; I did not make the lactopeptin, but bought it from a firm who obtained it directly from the manufacturers.

MR. COLCORD.—Whether you had made the article and examined it, according to his formula that he pretends it is made by?

MR. SCHEFFER.—No, sir; I did not think it necessary. I made pure diastase in order to make the experiments.

MR. CREUSE.—The firm who manufacture lactopepin use a large quantity of the pancreas of the pig, in fact, in such quantities that frequently pancreas cannot be obtained in the New York market except through them; but whether they use it in the manufacture of the lactopeptin, or for the preparation of pancreatin, I do not know.

MR. DIEHL.—The point Mr. Colcord wished to make, in asking the question as to whether Mr. Scheffer had made a lactopeptin according to the formula given by the manufacturers, is not quite clear to me. It certainly occurs to me that if you apply the tests that the firm advises as regards its strength, and if those tests prove it to be different from what is claimed for it, that that is an indication that the preparation is not as represented, which is proven as well by the microscopic character of the preparation as by the chemical tests made by Professor Scheffer.

The following queries were, on request, continued for another year: No. 12, on the Preparation of Chemicals by Pharmacists, to James R. Mercein; No. 19, on the Bromine Production of the United States, to H. S. Wellcome; No. 20, on the Leptandrin of Commerce, to H. G. Keasbey; No. 21, on the Resinoids of Commerce, to W. J. M. Gordon; No. 23, on Mortars best adapted for making Emulsions, to E. Gregory; No. 25, on the Root of Epilobium Angustifolium, to C. J. Biddle; No. 15, on Chloral Hydrate and Camphor, to Joseph Roberts.

Mr. Saunders read a paper, by E. D. Chipman, on the Acrid Principle of Squill (see page 526), in answer to Query 18.

MR. MAISCH.—The conclusions arrived at by Mr. Chipman are entirely different from those at which some investigators like Flückiger have arrived. He ascribes the itching property mainly or solely to the presence of oxalate of calcium. The crystals are slender, and very sharp, and easily penetrate the skin, thereby producing irritation. This is mentioned in his German work printed some ten years ago; also in the "Pharmacographia."

Mr. Jarrett exhibited a bark taken from one of seven bales sold as cinchona, six bales being correct. The bark was unknown to the members present.

Query 22, on the Medicinal Effects of Succus Conii and Hyoscyami, being called up, it was dropped, and the following explanation made:

Mr. Eberle.—I wish to decline answering that query. It needs some explanation, as a matter of justice to the Association. I accepted it in Boston, expecting I could receive assistance which I felt would be necessary to determine the properties and the values of the two. I had at the time, in my neighborhood, a physician who had been particularly interested in conium and in its administration. I hoped to secure his assistance and furnish an acceptable answer, but I failed to enlist his interests. The query is one mainly for the physician, and I therefore ask permission to decline it, hoping some one else may take hold of it. When the physician of whom I speak was interested in the administration of this preserved conium juice, he gave it freely and in large quantities, very much more than we would suppose it proper to give, and, finding the samples varied in strength and in effect as they were changed from time to time, he took the preparation of the fluid extract of the unripe fruit as prepared by Dr. Squibb, and found immediately a very much more successful and reliable result. After some lapse of time, not having cases adapted to its use, his prescription came, and the fluid extract was dispensed from the bottle that had been used occasionally probably for three or six months. The patient was directed to use considerably larger doses than he had been using previously, in order to obtain a satisfactory result, but, upon the renewal of the prescription from another bottle, the preparation acted with unexpected energy, and endangered the life of the patient.

The Committee on Papers and Queries stated that they had been informed by Mr. J. Williams that his paper in answer to Query 24, on Sulphuric Acid as an Impurity in Tartaric Acid, would be mailed in time for this meeting. It having probably miscarried, the committee suggested that it be referred to the Executive Committee, in case it should be afterwards received. The suggestion was approved (see page 542).

Mr. L. Dohme read a paper on Arsenic in Phosphorus, in answer to Query 26; it was referred (see page 541).

Dr. Pile.—Mr. Markoe informs me that he had obtained some arsenic in making phosphoric acid from American phosphorus.

The following queries were dropped, the acceptors not being prepared to furnish an answer: No. 6, on Commercial Fluid Extracts; No. 13, on the Properties of the Bracts of Hops; and No. 14, on the Valuation of Hops and of Lupulin.

On motion of Mr. Lemberger, the Association adjourned until half past two o'clock.

Sixth Session.—Saturday Afternoon, September 16th.

Pursuant to adjournment the Association met, Vice-President Sheppard in the chair. The records of the preceding session were read and approved.

On motion of the Business Committee, it was resolved that a Committee on Adulterations and Sophistications, consisting of three members, be appointed.

The following report was placed upon the President's desk and read by the Secretary:

TO THE OFFICERS AND MEMBERS OF THE
AMERICAN PHARMACEUTICAL ASSOCIATION:

The Committee on President's Address, Secretary's and Executive Committee's reports, would report that the first and second items, consisting of President's Address and Secretary's Report, have already met with such action on your part as to render further suggestions in regard to them unnecessary.

In the report of the Executive Committee we find that they have provided badges for the officers of this Association at a small cost, and we would recommend the action as eminently proper, and recommend your approval of the same.

Very respectfully,
PAUL BALLUFF,
J. C. WHARTON,
E. H. SARGENT,
Committee.

The report was, on motion, accepted, and the recommendation contained therein adopted.

The Business Committee nominated Mr. Henry J. Rose, of Toronto, Local Secretary for the ensuing year, and on motion of Mr. Peixotto, the Permanent Secretary was directed to deposit an affirmative ballot for the nominee, which being done, Mr. Rose was declared duly elected for the position.

The following Queries were ordered to be dropped: No. 27, on the Character of the Peruvian Bark supplied to the Public; No. 33, on a Definite Morphia Strength of Tinctura Opii; No. 37, on the Medicinal Strength of Commercial Castor Oil; No. 45, on the Value of Commercial Pancreatic Preparations; No. 46, on a Process for Apomorphia; and No. 43, on the Cultivation of Medicinal Plants in the United States.

The following Queries were continued for another year: No. 28, An Essay on Gelseminum Sempervirens, to W. H. Jones, Boston;

and No. 41, on the Sugar-coated Quinine Pills in our market, to David Hays, New York.

Mr. Saunders read a paper, in answer to Query 31, on the Advantage of retaining Alcohol in Tinctura Ferri Chloridi (see page 481).

Mr. Kennedy.—I have experimented somewhat with the preparation made by water, and also with dilute alcohol during the past year. I find, when water is used, it has at first a very light color, but soon gets that reddish-brown color after standing two or three weeks, and is altogether destitute of the muriatic ether odor, and no precipitate takes place. I have had some nine months. With dilute alcohol there is a slight odor of muriatic ether, no precipitate takes place, and the solution is darker in color. I think it is desirable to retain the alcohol as the muriatic ether is claimed to have diuretic properties. I have, during the past year, where simple syrup and tincture of iron was prescribed, and where the iron was wanted for the sake of the iron, been in the habit of using the tincture prepared with dilute alcohol, but when it is prescribed by a physician with acetic acid and liquor ammoniæ acetatis I always give it containing the alcohol.

Mr Saunders.—I have seen samples of tincture made with dilute alcohol instead of with strong alcohol, and considered that a fraud on the medical world. I think it is carrying economy too far for the retail pharmacist to undertake to modify the national standard in that way for the sake of saving a part of the cost, with a view of being able to sell it at a lower price than it could be sold if stronger alcohol were used, and sell it under the pretence that it was made according to the Pharmacopœia. In Canada we are supposed to follow the British Pharmacopœia. In our place we do a tolerably large dispensing business, and although the aqueous preparation has been officinal for several years, it has never been called for or ordered in a prescription, and I never heard it mentioned by a physician in my neighborhood.

Mr. Wharton.—Is not the change of color that has been alluded to after the tincture has been made a short time due to an excess of nitric acid?

Mr. Kennedy.—That question I am not prepared to answer. The color is certainly decidedly lighter than when prepared with alcohol. I think if it was solely due to the nitric acid, the two preparations would likewise have the same color.

Mr. Rice.—I would like to ask if, in the opinion of the Association, it is justifiable for the maker of this tincture of iron to leave out a part of the alcohol? If so, the wholesale maker of it would make quite a saving, but I should suppose he would lay himself liable to a charge of fraud. As to whether the saving to be made in this way is justifiable I would like to hear the sense of the meeting.

Mr. Benjamin.—The writer of the paper stated that the tincture of chloride of iron was used as a tonic, but it is sometimes employed for very important purposes other than that of a tonic. For instance, its action in erysipelas has been of late found to be very important and very decisive, and no tonic has ever been discovered to take its place in that particular disease, for in one, two, or three days, under large doses of tincture of sesquichloride of iron, the most important changes in that disease have been produced. Now erysipelas is one of those classes of diseases that are supposed to depend upon the action of some ferment within the system, some zymotic influence, and if the tincture acts as an antiseptic, and interferes with this fermenting process going on in the system, may it not possibly be that such a change as removing entirely the alcohol and substituting water may interfere very much with its action?

MR. KENNEDY.—I wish to say a few words in reply to those members who consider it a fraud to make a preparation contrary to the Pharmacopœia process. I think we are, in duty bound as pharmacists, to make preparations according to the best means we know, even outside of the Pharmacopœia, and if we discover a new process better than that recommended by the Pharmacopœia, then we should use that and no other. We are always making new discoveries. I do not see where the fraud comes in.

MR. MAISCH.—In regard to the substitution of dilute alcohol for alcohol I do not quite agree with my friend Kennedy; but I rise not for the purpose of mentioning this, but more for the purpose of calling attention to another point which, in my opinion, has been overlooked in the discussion, and also in the paper read. Unless I am very much mistaken, the reason Query 31 was propounded was that the tincture was abandoned in the British Pharmacopœia because the ferric chloride is partly reduced to ferrous chloride, hence the preparation is never of the same composition. The older it is, or the more it is exposed to the light, the more will it change in its composition, being a mixture of ferrous and ferric chlorides in variable proportions.

MR JUDGE.—That was the object of the original query.

MR. KENNEDY.—I think Mr. Maisch is a little mistaken when he says I advocate the water process. I simply stated I had experimented with it during the past year to see whether it would precipitate or not with various strengths of alcohol, and I stated I considered alcohol the best menstruum, on account of its producing the muriatic ether which has the diuretic properties.

MR. PFEIFFER.—In preparing tincture of iron I have used very strong alcohol, and have always had a precipitate. I would like to know the cause, and what that precipitate is.

MR. WHARTON.—I have examined the precipitate of a number of different lots of tincture of iron, and my conclusion is that it nearly always is sulphate of lime, mixed perhaps with a little sesquioxide of iron, though of that a little quantity. There is either sulphate of lime in the original acid, or else there is free sulphuric acid. Now, in either case, I think in the ordinary course of preparation sulphate of lime would manifest itself, from the fact if it be there at first it must certainly come out, and if sulphuric acid is there, this acting on the glass or porcelain vessel, most of which contain lime, produces the sulphate of lime. It will pass into the solution, and mix with the alcohol, and remain in the solution for a time, but in the course of a few days precipitates.

Mr. Pfeiffer.—After it stands a day it begins to precipitate, perhaps an ounce or an ounce and a half to the quart. I have brought the question before our Association in St. Louis, but they have never found out the cause of the precipitate.

Mr Judge.—I would ask if the gentleman's solution has not been very acid?

Mr. Pfeiffer.—I never tested it, but the same objection has come to me from several other parties.

Dr. Pile.—In my experience with this tincture there are two reasons why this precipitate occurs. One is that the alcohol is too strong. The Pharmacopœia does not direct alcohol of 95 per cent. Therefore those who make it so do not make it according to the Pharmacopœia. It should be about 87 per cent. When it is made with strong alcohol it precipitates more certainly than when made with the officinal. The other reason is that the solution is too neutral. It should always be decidedly acid. An excess of muriatic acid will prevent that precipitate, and for that reason, in making large quantities, I always try a small portion first, and set it by for a day to see whether that will precipitate. If it does I add a little more muriatic acid to the liquor ferri chloridi, and find then the tincture will not precipitate.

A Member.—I should like to know where the gentleman gets his sulphuric acid that he spoke of?

Mr. Wharton.—We know that muriatic acid is formed by adding sulphuric acid to common salt, and that is where the sulphuric acid comes in. By testing the commercial muriatic acid with chloride of barium solution we will get a precipitate of sulphate of barium, indicating the presence of sulphuric acid in the muriatic acid.

Mr. Sharples read a paper on the Substitution of Parts by Weight for Absolute Quantities (see page 453), in answer to Query 30.

Mr. Maisch.—In regard to dispensing by weight, I believe Prof Sharples is mistaken. On the continent of Europe weights alone are employed, and it is only in Great Britain and this country that liquids generally are dispensed by measure. On the continent of Europe the physician prescribes so many drachms of water or syrup, and he is expected to know that 30 drachms of water will make 2 tablespoonfuls, and 40 drachms of syrup about the same measure. It is true that the division of the liquids by the patient must necessarily be done by measure, but it is the nearest approximation to dividing into accurate doses we can attain, unless each dose be put up separately by the pharmacist. I think all those gentlemen who have had experience in it will agree with me that those who have used weights in dispensing once will hardly feel inclined to give them up in favor of measures.

Mr. Royce.—In favor of the adoption of parts by weight it may be mentioned that so intelligent people as the Germans should, in their Pharmacopœia, use them. In the wholesale establishment with which I am connected we weigh almost everything, and measure very little, finding it very much more convenient to weigh than to measure.

Dr. Pile.—The difficulty in this subject will be more in dispensing than in preparing medicines by the druggist, for that can be done by weight very readily; but it would be difficult for the physician to know how much of an article to give, for he generally gives liquids by the teaspoonful. Even provided the teaspoon was exactly one drachm it would be impossible for him to tell how many fluid drachms there would be in a mixture where such diverse liquids are mixed together; therefore to divide it by teaspoonfuls the doses would be quite uncertain. For that reason I think liquid measure would be far preferable, for then he could make the prescription a certain number of fluid ounces, knowing that there were eight teaspoonfuls in an ounce.

Mr. Maisch.—The physicians in Europe never use the liquid measure, but use the weight instead. They ought to know that syrup weighs about one-third more than water, and consequently that, instead of 15, it takes 20 grams of the syrup to make a tablespoonful.

Mr. Judge.—We have in Cincinnati many German physicians that continually prescribe by weight. The prescriptions are compounded by weight, and there is no more difficulty in it apparently than in prescribing by measure. The fact is that the physician has learned to prescribe in that way.

Dr. Pile —The patient would have to have a pair of scales, and weigh the dose.

Mr. Maisch.—The physician is expected to prescribe such quantities of certain liquids that the patient can measure. Therefore the physician ought to know the specific gravities of the various liquids. If he knows them he can prescribe a certain measure.

Mr. Wharton.—It seems to me, if the physician prescribes by weight we can put up the medicine by weight; if he prescribes by measure we can put it up by measure. We are not trying to regulate what the physician shall do, but what we as pharmacists can do; and if we can accomplish the same result by weighing our liquids in preparing them, if there is any advantage in it, let us adopt that. It will not matter to the physician if we get the same result, and in prescribing they will be as free as possible to prescribe by weight or by measure.

Mr. Sharples.—I suggested the continuance of the question so as to keep it before the Association year by year until it becomes familiar to every one.

The Auditing Committee presented the following report:

The committee appointed for the auditing of the accounts of our worthy Treasurer, Charles A. Tufts, respectfully report, that they have examined the Treasurer's books carefully, compared the payments with his vouchers, and find them correct, the books showing a balance on hand in favor of the Association of $941.33 (nine hundred and forty-one dollars and thirty-three cents). In addition to the above, the committee cannot but help complimenting the Treasurer on his neatness and business-like manner and accuracy of keeping the accounts.

George Leis,
John Ingalls,
James T. Shinn.

Philadelphia, September 16th, 1876.

The report was, on motion, accepted, and the committee discharged.

Mr. Wellcome made some verbal remarks in relation to the varieties of Damiana, recently introduced (Query 35). They were substantially the same as previously reported by him in the journals, and as found on page 185 of the Report on the Progress of Pharmacy.

Mr. Mohr.—When damiana first attracted the attention of the physicians in my section of the country (Mobile, Ala.), I wrote to New York for a sample of true Mexican damiana, with sufficient characteristics, if possible, to enable me to investigate its botanical qualities, and in quantity sufficient to look into its constituents. The plant seemed to be suffruticose, and about a foot high; leaves and stem pilose and dotted with resinous dots; of a strong aromatic odor and pungent taste. The flowers showed it at once to belong to the family of the Compositæ. I have not been able to make out its exact generic character, but from the involucre and the pappus take it to be somewhat allied to the genus Sericocarpus, and hope to get some more accurate information upon that point. Regarding its pungency and large quantities of volatile oil, I class it among the remedies to which diosma or buchu belongs. I accordingly prepared a tincture, in the same way as tincture of buchu is prepared, and physicians have tried it. In no case whatever has the faith in damiana been justified. Several pounds, which I have placed at the disposal of physicians, have been used, but in no instance has any satisfaction been derived from it. I have written to some friends in Mexico, to send me better specimens, prepared in such a way as to allow of a perfect botanical determination, and I hope that I shall receive replies to my request that will enable me to give a little more satisfaction on that point.

Mr. Wellcome.—I think the plant which Mr. Mohr refers to is the same as the New York damiana, and according to Gray it is Bigelowa veneta.

Mr. Maisch.—Was it not believed to be a species of Haplopappus, or are the two synonymous?

Mr. Wellcome.—It was supposed to be so at first, and is referred to by some as Haplopappus.

Mr. Maisch.—Then the two are not synonymous?

Mr. Wellcome.—It was first considered Haplopappus.

Mr. Pfeiffer.—We have had both kinds, the Washington and the New York damiana. We found very little results from the former, but with the fluid extract of the latter we got very good results. The only disadvantage was that it could not be made pleasant to take.

Dr. Fr. Hoffmann exhibited a low-priced microscope, made by Messter, of Berlin, and recently imported by him. He explained its construction and advantages, and showed a number of microscopical sections.

Mr. Sharples.—Crouch, within a few years, has been making low-priced microscopes, which are sold in this country at from $30 to $50. The best, at $45 to $55, answer every purpose, and have the advantage that with them the best objectives can be used that are made. We are no longer in the condition we were in a few years ago in regard to microscopes. I should say that Crouch, of London, has in the Exposition some splendid instruments for students' use, at prices not over $40.

Mr. Maisch.—I would suggest to the Committee on Queries to prepare a query on low-priced microscopes, with the view of getting a report, giving the good and bad qualities of each.

Mr. Saunders.—I examined a microscope used in the Museum at Cambridge, made by Carl Wise, and costing about $20 here. It seemed to have very excellent defining powers. This one appears to have very good defining powers. What is the highest power you have?

Dr. Hoffmann.—300 diameters. Hager states it is as good as a microscope of much higher price.

The President.—If you get a good definition, entirely free from color, where the lenses are used by themselves, you cannot get a good definition where they are put together. When they are said to be equal to those fine English lenses, or those made here by Tolles, it is impossible.

Mr. Sharples.—I was going to mention another objection to these cheap instruments, which is, that every student is in a position to borrow an improved objective, and unless the instrument has on it the universal screw which is used by all good microscopists in England, this country, and France, and is now being adopted by the Germans, his instrument is comparatively worthless, because he generally comes to a place where he wants to see something just a little beyond any objective he has. He can generally borrow one, and the stand to be useful must be one that will carry these high-power objectives. There are stands in this country that can be bought for $25 or $30. The student can then buy eye-pieces at a little additional cost, and then he has a stand that will work well with the best objectives he can get. Without a stand that will carry these it is hardly worth while to invest his money. My advice to all students, and to all that are beginning to study microscopy, is to get such a stand in the first place, even if they get a low-priced one, on which they can put on the higher powers. It is no use to buy a small instrument, and as soon as you get interested in the subject find you must dispose of it.

Mr. Saunders.—It is often a question between getting a second-class one or none at all, and I think that instrument is a good one of its kind. When the student gets to a point that he can work with a microscope of that quality, he can get some of his friends to lend him a better one. I think it is important that the use of these cheap microscopes should be encouraged. I have one of Smith & Beck's best microscopes, and I know what a good microscope is; but in my own work I seldom use an objective higher than an inch and a half, and that instrument would do good service in nineteen cases out of twenty. It is only occasionally that a very high power is used, and then a first-class microscope is indispensible; but in the ordinary work of microscopic examination of the adulteration of drugs and crystals, these small instruments are just as useful practically as the large ones.

Mr. Sharples read an essay on Graduated Measures (see page 459), in answer to Query 38.

Dr. Pile.—In this connection, the graduated measures made by Mr. William Hodgson's patent should be mentioned. The graduation is made on a mould, and the marks are on a glass projecting out. I have examined a great many of those measures, and have had something to do in making patterns for the moulds; and last year, I think it was, perhaps it was the year before last, I gave a table of measurements of a great many of these measures, to show their accuracy. I found from the one-ounce up to the eight-ounce measure, and from the drachm up to the sixteen ounce, that the difference was very trifling, not more than the thickness of the lines, and that thickness was not greater than could be observed by the eye, on account of the refraction of the light. It came within the size of which the eye could judge, and therefore to my eye was very accurate. I believe the patent has expired, and I do not know who makes them now.

Prof. Sharples.—I have not criticized any method of graduation or any measures. I have spoken of the general principles which should govern the construction of these measures, merely condemning from a purely theoretical point of view the conic graduate, as being the one which fulfilled none of the conditions for successfully reading the measure. I believe the graduates Dr. Pile now speaks of are made by Whitall, Tatem & Co. I know nothing of their accuracy, but suppose they are as accurate as most that are in the market.

Mr. Wharton.—Prof. Parrish, in his pharmacy, has a drawing of a graduated measure, and the line made by the capillary attraction on the glass. The line that seems to be the true surface of the liquid is divided, and he recommends taking the medium line. In large graduates I have no doubt the former speaker is correct, that the bottom should be taken; but in small measures I think Prof. Parrish is correct.

Mr. Bedford read a paper by Mr. Gregory, on Emulsions (see page 485), in answer to Query 39.

Mr. Wharton.—There are two conditions, one in which the globules of oil are surrounded by the watery mucilage, and the other in which the mucilage is surrounded by the oil; just opposite conditions. Of course, a true emulsion would be one in which neither of these conditions existed. I made an emulsion, commencing it beautifully, but poured in a large quantity of oil, and immediately the emulsion became broken up into globules, which were impossible to grind together with a pestle. Thinking I had spoiled the emulsion, I was on the point of throwing it away, but took a mortar, in which I had some of the good emulsion left. A tablespoonful, I suppose, was all I had, whereas I had, I think, about a gallon and a half of unmixed emulsion.

I poured a small quantity of this spoiled emulsion into this small quantity of good emulsion, and triturated it, gradually adding the spoiled, and uniting the gallon and a half. When I had half an ounce I added a drachm. That united and gave me a greater quantity than I had at first, and in this way I was able to finally add a large quantity of this other emulsion. It seemed to me, when I put this great quantity of oil in, I had, as it were, surrounded the emulsion with a film of oil separated into globules.

A paper by G. A. Zwick on Wafer Capsules (see page 462), written in answer to Query 40, was read by Mr. Judge.

Mr. Wellcome.—We find wafer capsules pretty generally scattered over the country, but generally laid aside and gone out of use in a few months. In regard to the objections, I would cite one instance which occurred in New York. The physician prescribed salicylic acid, five grains in each wafer, and on attempting to swallow it the capsule was ruptured and the dry acid caused strangulation and illness to follow. There are other objections which are very evident. The easy fracture of the capsule on being kept for some length of time by the patient, or by roughly handling them; for instance, when inclosing quinine, the liberation of the dry powder in the box will cover the surface of it, and we find the wafer as disagreeable to take as the dry, bitter quinine. They don't seem to have met continued favor.

Mr. Saunders.—I don't think there are any of these formulas for administering medicines which are of universal adaptation. I should be surprised to see any physician give salicylic acid in that way. They are no doubt very useful in the administration of quinine and other substances, but I should think their use in the administration of an irritating substance like salicylic acid would be condemned by almost every one. The ease with which they can be swallowed is very much in their favor, and I know a number of instances where they have been highly appreciated by the patients in taking remedies that were simply disagreeable, and not irritating.

Mr. Wellcome.—Take a substance like quinine, and let the capsule be ruptured, I think it would be very disagreeable. The disadvantages seem to be so great that there can be little said in their favor.

Mr. Judge.—I have dispensed a great many of them, and never knew one single case of accidental rupture, if proper care was taken, in using capsules that are not already ruptured, and in moistening the edges.

Mr. Painter.—That has been my experience. When they are properly prepared the patient experiences no inconvenience when he has proper instruction in taking them. Before having seen any of the machines which have been sold in the East, I prepared a machine myself, and I made the shape, instead of round, spoon-shaped, as it would appear to be more easily swallowed. Whether it is or not is a question; but the patients object to the large size of the other wafers, whereas if it is made in spoon-shape they swallow them readily.

Query 42, on French Filtering-Paper, was continued to Mr. J. S. Talbot for another year.

Dr. Pile.—As this question is very important, and we will all have to use this filtering-paper for another year, I would ask the members to give an idea what could be done with the paper we use now to improve it, and prevent the coloring matter from coloring the preparations which are filtered through it, especially chemical preparations. Perhaps something could be done.

Mr. Folger.—On treating the colored filtering-paper with dilute hydrochloric acid most of the coloring matters are removed, when it can be used for most ordinary pharmaceutical purposes without imparting any color to the filtrate. The paper, after being treated with hydrochloric acid, is washed with water to remove the acid; then it is tolerably purified.

Mr. Brown.—A dilute alkali solution will answer the same purpose, although it requires considerable washing to get the alkali out.

A paper by Mr. Ramsperger, on tests for the purity of Oleum Theobromæ (see p. 527), in answer to Query 44, and a paper by Mr. William Saunders on American Cantharides (see p. 505), in reply to Query 47, were read.

Mr. Saunders.—I am sorry not to be able to present a complete answer to this query, owing to the difficulty of procuring a sufficient quantity of the insects referred to. As a substitute, I propose to present a paper on cantharides, more especially referring to American cantharides, in regard to their geographical distribution, activity, and history. I have had a plate prepared, a specimen of which is shown.

The Secretary.—The Association should be informed of an omission on the part of Mr. Saunders. He stated that he had had a plate prepared, but should have added "at his own cost," and he offers copies of it for the Proceedings of the American Pharmaceutical Association.

In accordance with the wish of Mr. Saunders, Query 48 was dropped, the determination of the insect attacking rhubarb not having been made.

Mr. Eberbach read a paper on Santonin (see p. 544), which was accompanied by samples of the products obtained by the different solvents.

Mr. Maisch.—Has Mr. Eberbach tried petroleum benzin?

Mr. Eberbach.—Yes, sir. Santonin is but very slightly soluble in it. I tried it also with methylic alcohol, but the result is the same.

Mr. Pfeiffer.—Has light any effect on santonin?

Mr. Maisch.—It turns it yellow.

Mr. Pfeiffer.—Has it any medicinal effect? Does it decrease the virtue?

Mr. Maisch.—I don't think so.

Mr. Pfeiffer.—I always see it come in dark bottles, and prefer it to be kept in a dark place. I don't know whether it has any effect.

Mr. Wharton.—Have any of the members ever noticed that santonin, when taken, produces a peculiarity of vision; that lights and other objects appear colored, sometimes yellow, sometimes green. It has been so with myself, and I notice the Dispensatory speaks of another instance.

MR. MAISCH.—That is mentioned in all medical works.

Professor Sharples read a volunteer paper on the Detection of Adulterations in Milk (see p. 554), which was accepted and referred.

The President appointed the following Committee on Adulterations and Sophistications: Professor E. Painter, E. H. Sargent, and W. H. Pile.

On motion, adjourned until eight o'clock.

Seventh Session.—Saturday Evening, September 16th.

The Association met at the appointed time, President Bullock in the chair. The minutes of the sixth session were read by the Secretary and approved.

The Nominating Committee made the following nominations for the newly created standing committees:

For Committee on Prize Essays.—Charles Rice, New York, Chairman; George C. Close, Brooklyn; and Edward P. Nichols, Newark, N. J.

For Committee on Legislation.—John M. Maisch, Philadelphia, Chairman; Samuel M. Colcord, Boston; William H. Crawford, St. Louis, Mo.

On motion, the Secretary was directed to deposit an affirmative ballot for the nominees, and they were declared duly elected.

The Executive Committee reported the names of the following candidates for membership:

Connecticut.

Charles A. Rapelye, Hartford.

Louisiana.

Louis Genois, New Orleans.
Robert N. Girling, New Orleans.

Maine.

Richard H. Moody, Belfast.

Maryland.

Theodore Rohrbach, Cumberland.

New Jersey.

Charles W. Warrington, Moorestown.

New York.

William Wilson, New York.

Pennsylvania.

Henry Trimble, Philadelphia.

Canada.

James Bowman, London, Ontario.

Messrs. Joseph Roberts and J. F. Hancock were appointed tellers, and reported the unanimous election of the candidates.

Mr. Hancock read a paper, treating of the Arrangement of the Dispensing Department (see page 456), as an answer to Query 49; and Mr. E. C. Jones one on Cinnamon-water (see page 485), in answer to Query 17.

Mr. Markoe.—I have paid considerable attention to the preparation of cinnamon-water, and have not been able to get any satisfactory results from either the use of oil of cassia or oil of cinnamon. If made from oil of cinnamon, it very rapidly becomes turbid and soon loses its characteristic odor and flavor, which has been repeatedly shown to be due to the formation of cinnamic acid. The oil of cassia will make cinnamon-water which has a more permanent character. I think, if any member will take the trouble to make their cinnamon-water by distillation, even if they do not use Ceylon cinnamon, they will get a preparation so superior I don't think they would go back to the old process. One of the most marked characteristics of the distilled water is that it has an exceedingly sweet flavor, vastly more like the bark than any of the oils; furthermore, it keeps a long time without change. In the experiments I have made recently with it, using the cinnamon bark in the proportion that the Pharmacopœia calls for, I found that there was a great excess of oil, much more than the water would dissolve, so there was really a waste of the bark in following the directions of the Pharmacopœia. Under these circumstances I made some experiments with diluting it with hot distilled water, until a sufficient quantity had been added to dissolve the oil. In that way I got a water which is exceedingly pleasant in flavor and satisfactory in odor. I think the Pharmacopœia ought to throw out the preparation of cinnamon-water by means of the oil.

Mr. Maisch.—The cinnamon bark was intended to be in excess, so that the water should be saturated.

Mr. Hancock.—If this oil was permitted to remain in the bottle it would not be distributed after awhile through the water, or be taken up by the water?

Mr. Maisch.—No, sir.

Mr. Hancock.—I have noticed that condition of things in distilled cinnamon and other waters. Globules will collect on the surface and afterwards disappear. When that was first noticed, I supposed the stopper was not secure and it escaped by evaporation, and I tried the experiment further, and screwed the stopper in. I found, by slight agitation and keeping it a little while, these globules did disappear and the water apparently became richer in flavor. I greatly prefer the process of distillation for cinnamon-water. It produces a finer water, and very different from that made with oil, though not really nice at first. It requires some time before it becomes mellow and agreeable, but then it is exceedingly sweet to the taste, and in odor. Carbonate of magnesium I have long since discarded, and use the paper pulp instead. It is necessary to be careful in the amount used, because it can be used to the extent of taking out of the water all the oil dissolved in it.

Mr. Markoe.—The first addition of distilled water was only made after the first distillate had been agitated thoroughly. I think the results were exceptional, because the samples of bark were exceedingly nice, of recent importation, and quite good in flavor. Perhaps subsequent experiments would not give so much excess of oil. I coincide with Mr. Hancock, that the water ought to be kept some time before use, but being fresh it is far better than anything you can get from the oil.

Mr. Saunders.—Those gentlemen who live in the city are getting too far ahead of us who live in the country. We have not the facilities for distilling all these waters, and if we were obliged to distil enough to keep a stock for two or three months ahead, we should not require any other occupation. Still, I have no doubt it is a much nicer way, where it can be done. I suppose one of the main objects in constructing formulas is to make them so as to be as practicable to the large class as possible. In view of that, and in view of the fact that oil of cassia is almost entirely used, whereas oil of cinnamon is ordered, I think it would be very desirable in the new edition of the Pharmacopœia to specify oil of cassia instead of oil of cinnamon. I don't suppose one person in fifty uses oil of Ceylon cinnamon. The oil of cassia to most people is quite as good; it is as pungent and covers unpleasant medicines quite as well.

Mr. Hancock.—The waters, as made of the two oils, oil of Ceylon cinnamon and oil of cassia, are altogether different. I find there is a little confusion in speaking with pharmacists on the subject, as to which of the two the Pharmacopœia intends, whether it is the cassia or the Ceylon cinnamon, and consequently a great many use the Ceylon cinnamon in making the water, and a great many others, the majority, I believe, use the cassia. Some persons are inclined to use the cheaper articles, and others rather go to the other excess, thinking they must use the most expensive article. It was my habit, for a long time, to use Ceylon cinnamon, believing that was intended, but my attention was called to a careful consideration of the subject, by a physician who ordered a prescription of bromide of potassium and cinnamon-water, which was compounded at my store. A copy being given, it was put up at some other store where the cassia-water was used, and when it came back to my store again, to be replenished the third time, it was put up by myself. The same water as at first was put in, and the prescription was brought back by the physician himself, saying the patient objected very strongly to the cinnamon-water I used; that the water that had been used by another pharmacist was different, sweeter and nicer, and more palatable. He thought I was very careless in making my cinnamon-water; after that I used cassia.

Mr. Sheppard.—I have made it from the oil with purified animal charcoal.

Mr. Roberts.—I use oil of true cinnamon and paper pulp in making it, and have had no difficulty in giving satisfaction to the physician and patient. It keeps reasonably well.

Mr. Markoe.—I do not mean to advocate that the aromatic waters in general should be made by distillation, but I think some of them can be better made than in any other way. In the case of cinnamon-water it is exceptional, and in view of the fact that when made by distillation it will keep unimpaired and will improve, I think it should be made only by that process.

Mr. Bedford.—I will ask Mr. Maisch whether the Pharmacopœia does not recognize both these varieties of cinnamon under one name; so there is no warrant for taking Ceylon cinnamon in any of the formulas the Pharmacopœia directs.

Mr. Maisch.—Under the name of cinnamon the Pharmacopœia recognizes both the Ceylon and Chinese cinnamon; but Oleum cinnamomi means the oil of Ceylon cinnamon only. I should like to ask the question how many gentlemen, in making anise-water, use the oil of anise. I suppose the great majority use the commercial oil of star anise, which is sold as oil of anise; but if you distil water from anise you will get a water with an entirely different taste. The oil of Pimpinella anisum yields a water that has a different flavor from that prepared by the oil of Illicium anisatum.

Mr. Hancock.—The same holds good with peppermint and spearmint waters. I have used these distilled waters some time, because of their great superiority, as distilled from the fresh plant, over those made from the oils, even when you get the best you can.

Mr. Kennedy.—I think waters made with the oils will give good results. Having made cinnamon-water by the two processes, I had, on renewing a prescription, the same trouble Mr. Hancock speaks of. It was returned, with the remark that it was not put up correctly, and I had to stop using the water from Ceylon cinnamon. I believe that the carbonate of magnesium ought to be discarded. Better results are obtained by distilling the water with the oil. A large still is not required, and a very elegant preparation is obtained after standing a few weeks.

Mr. Charles Mohr read a volunteer paper on the Constituents of Pycnanthemum linifolium (see page 513).

Mr. Maisch.—I am very much pleased to meet with an old friend of mine. It may perhaps be remembered, particularly by the members of the Philadelphia College of Pharmacy, that some years ago, I showed some plants which were sent to me from the interior of our State, where that identical plant is used as a supposed remedy in hydrophobia. I never attributed much virtue to it, because the virtues of the Labiatæ reside mainly in the volatile oil.

Mr. George Leis read a paper in answer to Query 29, giving some formulas for fragrant antiseptic lotions (see page 493).

Mr. Leis.—I wish to state that I have found it necessary to deviate somewhat from the query. I start with an antiseptic for use in the sick-room. The less the strength of the perfume the more desirable it will be to the sick patient. But it should be remembered that what will be agreeable to one will be disagreeable to others.

Mr. Maisch.—I would like to ask Mr. Leis whether, in his opinion, salicylic acid will act except upon those places it comes in contact with.

Mr. Leis.—My experience has been that salicylic acid acts as an antiferment. I have tried it with yeast, by putting it in contact with it, and it arrests fermentation.

Mr. Maisch.—Suppose you pour some in one place; how can it arrest fermentation in another?

Mr. Leis.—The object is a spray in the sick-room, so as to get the atmosphere filled with it.

Mr. Maisch.—Wet the floor with it?

Mr. Leis.—That could be done; by spraying it in the room, the spray will entirely absorb the bad odors of the sick-room and arrest any fermentation, unless you bring in another offensive smell. I found, by taking an offensive piece of meat and spraying this upon it, it destroyed the bad odor at once.

Mr. Maisch.—Meat is soft and juicy, and when a solution is put upon it it diffuses over it. Floors are dry. So if you throw a spray of liquid through the air confined in the sick-room it will destroy whatever germs may be in that portion. I grant the preparation will destroy or at least cover the odor.

Mr. Leis.—The object I had in view was to get a perfume which would be a pleasant and agreeable one in the sick-room, and I think I have the perfume. But I find that alone will not be sufficient, so I combine a disinfectant with it. Wintergreen has a very strong absorbing power, but it is objectionable in the sick-room in any great strength. So with any other odors; the patient will become sick of one odor, and I find by combining a delicate odor, not having it too strong, with an antiseptic or disinfectant, it does the work better than anything else. It is far better than chloride of lime, or any other disinfectant.

Mr. Garrison.—The objection which Mr. Maisch has urged is evidently well taken, and yet it may be to a certain extent overcome by atomizing the liquid so as to thoroughly impregnate every part of the room. Certainly that would be less complete than when chlorine is used, or carbolic acid, the first being a gas and the other a vapor. But those are not antiseptics on which, as ordinarily used, any great reliance can be placed. Suppose scarlet fever or some other infectious disease is to be prevented. In that case either a high heat above 212°, or an amount of these substances that is inimical to life, must be employed. Now I grant both chlorine and carbolic acid will apparently dissipate a great many bad odors. They outstink them, just as a mustard-plaster cures a great many pains by out-aching them. This, however, has the advantage that while it may outstink a bad odor its own odor may not be very objectionable. I thought the gentleman might enable us to sell a good perfume without putting a stamp on it, but I see he has failed in the grand point I hoped he would make.

Mr. Hancock.—The subject of this inquiry is one I have thought a great deal about for a long time. I endeavored to find out something that would be acceptable to use in the sick-room, and considered it would be advisable to have something of that kind published. I must say, as the last speaker has stated, that the gentleman has failed to produce an article suitable to the purpose. We do not want to perfume a sick-room with an article that is a powerful antiseptic. We want a perfume that is refreshing and invigorating to the olfactories of the sick person, and in my experiments I have found a formula, published by the Alumni Society of New York in its Proceedings three or four years ago, which is an old formula used at first by the actors. It was called Madame Hutin's cologne, and composed of oil of lavender, lemon, and rosemary. I have found that to be the most refreshing for general use in the sick-room that I have ever tried. I have recommended it to a number of physicians, and several of them frequently order it for that purpose, as something to wet a handkerchief with, and keep the sick smell off, and as an invigorating odor. Acids are often objectionable, and I think should be left out. I speak of this matter that the members of the Association may direct their attention to this formula, which is especially fitted for this purpose. It was stated that a perfumer had said that the oils were harmonious and exceedingly refreshing, and suitable for the sick-room.

Mr. Sheppard.—I move that Mr. Hancock be requested to furnish to the Publishing Committee a copy of the formula,* that it may be published with his remarks.

Mr. Vogelbach.—Has Mr. Leis tried the experiment of his combination without the salicylic acid as a deodorizer?

Mr. Leis.—I did try the perfume, and I experimented with a piece of meat, and also in a room that had an offensive smell, and found the perfume would only increase the smell. Place ammonia upon anything that is offensive and it will increase the odor. It will be more perceptible at once. That is on account of the volatile liquid.

Mr. Vogelbach.—I did not hear what the conclusions were; why salicylic acid should be an antiseptic and absorb these odors.

Mr. Leis.—The perfumes are the absorbent, and the salicylic acid arrests the fermentation.

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* The formula was communicated by George C. Close to the Proceedings of the Alumni Association of the New York College of Pharmacy, 1874, with the following remarks:

"Used by Madame Hutin (afterwards Madame Labasse) about 1830. She was a celebrated French dancer on the stage in New York.

Oil of Lavender,	ʒvi.
Oil of Lemon,	ʒvi.
Oil of Rosemary,	ʒij.
Oil of Cinnamon,	gtt. xx.
Alcohol,	6 pints.

"This, although very weak, was doubtless refreshing when used, as it probably was, freely to wash with after severe exertion.

"A well-informed perfumer says that it would answer the original design of cologne water, viz., as an application for the relief of headache, or for the use of the sick-room, where the ordinary sweet colognes are only deleterious. He says that oils of lavender and rosemary are always refreshing, while the sweet perfumes are often sickening to a weak person."

Mr. Vogelbach.—In floating matter?

Mr. Leis.—By sending the spray through the room it absorbs and destroys it entirely.

Mr. Creuse.—I think the addition of salicylic acid in this perfume is a very good idea, because, although salicylic acid is not volatile, if sent by an atomizer, it will permeate the room in the same manner that on the sea you find everything getting salty although no water reaches it, because very small particles are divided up into the atmosphere. For that reason I have no doubt that the perfume, as made by Mr. Leis, is much preferable to that which contains only aromatics.

Mr. Markoe.—I want to throw out the hint that some eminent authorities assert that the diffusion of volatile oils through the atmosphere is of the benefit that they are rapidly oxidized, and in that process give rise to the formation of ozone, which is one of the most active of the disinfectants. Indeed it is the agent which, sooner or later, purifies all disinfectants, and if that is the fact the presence of a volatile oil would be of service, and I think they would be of service just in proportion to their liability to oxidize. Oil of wintergreen is not one of those oils. The oils of the turpentine series, lavender, and rosemary, are very much more rapidly oxidized, and I think are more refreshing than a chemical oil like oil of wintergreen, which is an ether. I think there is some use in adding salicylic acid, but I cannot believe any portion you can throw out will do any good, because we have records of experiments where definite quantities, amounting to as much as one-fifth of one per cent. have failed altogether to prevent fermentation.

Mr. Vogelbach.—Would common salt not produce the same effect in a combination of this kind? You could make a solution, and combine the same articles with it.

Mr. Maisch.—You could dissolve in alcohol but little salt.

Mr. Vogelbach.—Not altogether in alcohol, but there are other solutions here.

Mr. Maisch.—It would take a larger quantity of salt to prevent or arrest fermentation than of salicylic acid.

Mr. Vogelbach.—Would the absorbent power not be the same in proportion?

Mr. Saunders read a volunteer paper, entitled Notes on Perfumery (see page 496). The paper was accepted with thanks, and referred for publication.

Mr. Vogelbach.—Mr. Saunders has given pretty good ideas in this paper, and his formulas are correct as far as they go. Now, as long as he has told tales out of school, I will tell another, and that is this: Put water to your perfumery until it becomes milky. There is hardly a perfume made but what will stand half water. The more water the finer perfume it will be, but it will take time before it can be used. That is the grand secret of colognes and extracts.

A paper, in answer to Query 36, treating of the Manufacture of Chemicals in the United States (see page 533), was read by Dr. A. W. Miller.

Query 51, referring to Improvements in the Preparation of Scammony Resin, was next called up.

MR. MARKOE.—I do not think I have gone far enough to settle the question. I have made five determinations, but they were all made with the same lot of scammony. The results as far as made are very satisfactory, and point in the direction that the present complication in the officinal process for making resin of scammony is needless, and the results obtained by it are only very little better than where simply an alcoholic extract is made. In support of this statement I would say I obtained a lot of pure scammony, the best I could get in Boston, for the purpose of making resin of scammony. I found I obtained by careful work 63 per cent. of resin of scammony. This, you will see, is less than that required by the United States Pharmacopœia. With the remainder of the lot of scammony I made four more experiments. The result of those experiments was that when the tincture was carefully evaporated on the water-bath to dryness I obtained 65 per cent. There is only a difference of 2 per cent. between the two processes, and if these experiments hold good I am satisfied that direct evaporation of the alcoholic tincture would be sufficient; that the difference of 2 per cent. would not be worth the extra trouble. This experience coincides with Dr. Squibb's in regard to resin of jalap, where he found the difference between the United States Pharmacopœia process and evaporation of the tincture was only 3, 4, or 5 per cent., and he gave his opinion in that case it was not worth while. However, I would like to have the query continued to me, and during the year I will make some more experiments upon a larger scale, and upon different varieties of scammony, and report at a future time.

The query was continued in accordance with Mr. Markoe's request; also, to the same member, Query 52, in reference to Concentrated Preparations of Aromatic Drugs; and to Mr. J. F. Hancock Query 53, on the Arrangement of the Store-room and Cellar.

Mr. Saunders read a paper by Mr. Heinitsh, on Wine of Tar (see page 490), in answer to Query 34, and exhibited samples of the preparations made by the different processes there mentioned.

Mr. Remington read a paper entitled "Michigan Opium." (See page 531.)

PROF. REMINGTON.—This so-called opium came from a friend of mine in Kansas. I wrote to him to give me the source, and received an answer stating that it came through a broker, but he was unable to obtain the source. In appearance and quality it is so much like that spurious Vermont opium that I have no doubt it is the same thing under a new name.

Mr. Remington also read a paper by Mr. C. L. Mitchell, entitled "Ergotin" (see page 465), which, like the preceding, was referred for publication.

Mr. Benjamin.—Some time ago, by the request of a physician, I undertook to make a preparation of ergot for hypodermic use. He had had more or less difficulty with the usual preparations of ergot, and even with that of Dr Squibb, which, however, he preferred to all others. The process which I adopted, after some consideration, gave me a preparation which in a pharmaceutical point of view I was tolerably well pleased with, and I gave it to the physician for the purpose of testing its therapeutic value. He was so much pleased with it that I afterwards gave some of the preparation to Professor Goodall and Dr. Agnew, both of the Hospital of the University of Pennsylvania, and they have tested it there to some extent therapeutically, as a hypodermic remedy, and I was informed by Professor Goodall some time ago, that so far he prefers this preparation to any other. The formula is this: Take two troy ounces of good powdered ergot, exhaust it with eight fluid ounces of alcohol, and evaporate the tincture slowly and carefully to two fluid ounces; the fatty matters, and some of the coloring matter, and other principles not supposed to be active, are now precipitated by the addition of eight fluid ounces of water. The product is filtered, and we then have a little over eight fluid ounces of a clear liquid, which is carefully and slowly evaporated to two fluid ounces. We have now a pure, aqueous solution of the active principles of ergot, unaccompanied by those fatty principles and other irritating substances. The next question was how to preserve it. Several substances were tried, but none seemed to act well, on account of their action upon the subcutaneous cellular tissue, generally producing congestion and sometimes inclination to abscess, which has been found the case with most of the hypodermic preparations of ergot. I tried salicylic acid. The acid stood in the proportion of about a grain and a half to the ounce, which seemed to preserve the preparation very well for two months, during the last warm summer, and the preparation has been used after having been kept for a month very satisfactorily. If, on further experiment, it is found to be a good hypodermic preparation, perhaps some of you may avail yourselves of the process to produce it.

Mr. Benjamin read a volunteer paper, entitled "Remarks on the Condition of Pharmacy" (see page 447).

The Committee on Papers presented the following volunteer papers: On Deodorized Tincture of Opium, by J. D. O'Donnell (see page 489); on Apprenticeship, by Charles Becker (see page 452);* and on Pharmacy in South America, by C. G. Wheeler (see page 441).

Mr. Saunders.—A paper has been handed in from Jacob Dunton & Co. in reference to compressed pills. The parties are not members of the Associa-

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* It was overlooked at the time, that the communication proposes the appointment of a special committee.—Secretary.

tion, and can only be heard as a special privilege, if the Association chooses to accord it. The paper, in the first place, refers to a communication by Prof. Remington on compressed pills, and a good deal of the first part is taken up in trying to disprove the statement there made, that there is a growing prejudice against compressed pills. The next portion is a series of extracts from various journals as to what they say about compressed pills. We all know how they are written up, and I suppose we have seen enough of them. The remainder of the paper contains nothing in the way of additional information upon the subject. It is for the Association to say whether they desire it to be read now.

On motion of Mr. Colcord, the paper was referred to the Executive Committee with full powers.

The Committee on Papers and Queries read the following list of new queries, which had been accepted to be replied to at the next meeting:

QUERY 1. The preservative properties of Boracic, Benzoic, and Salicylic Acids have lately attracted considerable attention. What are their respective values as preservatives, and which is best adapted to the uses of the pharmacist? If possible, give a ready method for its use.

Accepted by S. P. Sharples, Boston.

2. Veratrum Viride. As several different conclusions have been reached by late investigators in regard to the active principles of this drug, an accurate analysis is desired in order to definitely settle the subject.

Accepted by C. A. Robbins, New York.

3. The present officinal formula for the preparation of Fluid Extract of Ipecacuanha is both complicated and impracticable in its details, and unsatisfactory in its product. Should the formula of the Pharmacopœia of 1860 be retained in the next revision, or can a more perfect mode of preparation be devised?

Accepted by J. Faris Moore, Baltimore.

4. A more perfect formula for the preparation of Fluid Extract of Wild Cherry is desired, representing both the astringent and sedative properties of the drug.

Accepted by E. S. Wayne, Cincinnati.

5. The present officinal formula for the preparation of Confection of Senna directs the use of Cassia fistula, a drug not always easily obtained, and consequently has caused the substitution of other and less active drugs. Cannot this formula be modified, or the Cassia fistula substituted by some drug more generally in use?

Accepted by Adolph W. Miller, Philadelphia.

6. What are the comparative values of Benzoin and Styrax for preserving ointments, etc., from rancidity and decomposition?

Accepted by I. J. Grahame, Philadelphia.

7. Much difficulty has been experienced of late years in procuring an article of litharge for the manufacture of Lead Plaster which will yield a perfectly white plaster. To what is this variation owing, and what is the most ready method of determining a satisfactory article of litharge?

Accepted by E. S. Wayne, Cincinnati.

8. Which is the best menstruum for the preparation of Tincture and Extract of Arnica, Alcoholic or Hydro-alcoholic?

Accepted by M. L. M. Peixotto, New York.

9. The quantity of Acetic Acid in the formula for the preparation of Acetic Extract of Colchicum (U. S. P., 1870), is directed to be four fluid ounces for twelve troy ounces of drug. Is not this quantity unnecessarily large, and cannot less be used without interfering with the stability of the preparation? Also, can the formula be altered in regard to its menstruum by using alcohol with any advantage?

Accepted by I. J. Grahame, Philadelphia.

10. The present formula for Cantharidal Collodion contains but a very small quantity of alcohol, rendering the pyroxylon very difficult of solution. Cannot the quantity of alcohol be increased with advantage without materially interfering with the character of the film?

Accepted by Joseph Roberts, Baltimore.

11. Nearly all the Lactic Acid in use in this country is manufactured abroad. Cannot this acid be made as well and as cheaply in this country? Give a formula for its preparation.

Accepted by S. P. Sharples, Boston.

12. It has been asserted that nearly all the white wax now found in the market is adulterated with paraffin, Japan wax, and stearin. Is this so, and how can the adulterants be accurately detected?

Accepted by P. W. Bedford, New York.

13. In view of the coming revision of the Pharmacopœia, a review of the present class of officinal fluid extracts is desired, in order that their defects may be remedied and more satisfactory formulas adopted. Also, more information regarding the standard of commercial fluid extracts, with their sophistications and general state of purity.

Accepted by Charles L. Mitchell, Philadelphia.

14. When a syrup of Pyrophosphate of Iron is prepared by dissolving pyrophosphate of iron in simple syrup, after some time the preparation becomes much darker, and finally deposits a white scale. What is the cause of this? Is it a decomposition, and can it be remedied?

Accepted by J. F. Judge, Cincinnati.

15. The oleates of mercury, morphia, etc., have of late years been introduced into medical practice with considerable success. Give a standard set of formulas for their preparation, together with, if possible, a convenient and comparatively simple process for preparing pure oleic acid.

Accepted by W. S. Thompson, Baltimore.

16. Is there any difference in the quantity or quality of aqueous extract of aloes, when prepared with boiling or with cold water?

Accepted by George W. Kennedy, Pottsville, Pa.

17. What is the amount of alkali in the commercial calcined and carbonate of magnesia?

Accepted by George Leis, Lawrence, Kansas.

18. An essay on the use of citric acid and other preservative agents in syrup of iodide of iron.

Accepted by P. W. Bedford, New York.

19. What is the nature of the free acid contained in fluid extract of taraxacum, and is it augmented in quantity by age and exposure, and does a similar change take place in the root collected in accordance with the Pharmacopœia and kept with or without special precautions?

Accepted by H. A. Vogelbach, Philadelphia.

20. Several salts having been recommended to increase the solubility of salicylic acid in water, it is desirable to ascertain whether any chemical change is produced thereby; an essay on the subject with the investigation into the nature of such changes.

Accepted by David Hays, New York.

21. In making resina podophylli (U. S. P.) the concentrated tincture is precipitated by acidulated water, for which some manufacturers substitute an aqueous solution of alum. What effect has the substitution of alum and other acid salts upon the physical and chemical properties of the product, and what is the medicinal value of the principles remaining dissolved in the aqueous solution?

Accepted by B. F. McIntyre, New York.

22. A root having recently appeared in the market which resembles and is sold as senega, it is queried what is the origin of this root, and does it contain any polygalic acid?

Accepted by John M. Maisch, Philadelphia.

23. Give working formulas for the various pharmaceutical preparations of cod-liver oil in use in the United States, and of such as may appear desirable from other countries.

Accepted by J. Williams, Worcester, Mass.

24. Do certain medicinal plants lose their medicinal properties upon drying, and will it be better to tincture them while fresh?

Accepted by J. U. Lloyd, Cincinnati.

25. Stylophorum diphyllum, Nutt., which grows abundantly in the Western States, is closely allied to Chelidonium majus. A chemical analysis is requested, with a view to comparing its composition with that of chelidonium.

Accepted by O. Eberbach, Ann Arbor.

26. Spirit of Nitrous Ether. Determine, if possible, a method by which the product of the United States Pharmacopœia can be tested, so as to obtain a finished spirit containing uniformly five per cent. of nitrous ether.

Accepted by J. Creuse, New York.

27. Ergotin by Bonjean's method. Determine the yield when using alcohol of different strengths for the extraction of the aqueous extract, and give a working formula to secure a uniform result.

Accepted by Henry S. Wellcome, New York.

28. Guarana. Determine the best method for its extraction, so as to secure all the guarania with the least possible quantity or percentage strength of alcohol, and determine a rapid and pharmaceutically accurate method for the assay of the alkaloid in its various preparations and in the powder.

Accepted by S. W. Cochran, Camden, N. J.

29. Grindelia robusta. Determine the best methods for making the various galenical preparations.

Accepted by Charles L. Mitchell, Philadelphia.

30. Lactucarium. Is it desirable that a concentrated liquid preparation should be prepared, from which might be made the syrup, or tincture, or other preparations occasionally called for?

Accepted by Joseph L. Lemberger, Lebanon, Penna.

31. Extract of Licorice. How can this be most economically prepared of such a character that, while definite in its composition, it shall be readily and completely soluble in water?

Accepted by M. L. M. Peixotto, New York.

32. Glycerin is extensively employed in the manufacture of officinal and unofficinal fluid extracts. What articles are proven, by actual experience in the laboratory, to be improved by the addition of glycerin, and in what manner does the beneficial power of glycerin in such extracts exhibit itself?

Accepted by J. U. Lloyd, Cincinnati.

33. When spiritus ætheris nitrosi is mixed with fluid extract of uva ursi it is stated that in some cases a certain decomposition ensues, while in others no change is noted. What is the cause of the reaction?

Accepted by J. L. A. Creuse, New York.

34. What is the character of the Peruvian barks supplied to the public by the retail druggists of America?

Accepted by L. M. Royce, New York.

35. An examination into the methods of distinguishing the alkaloids of cinchona bark from each other.

Accepted by S. P. Sharples, Boston.

36. A report on microscopes suitable for the pharmacist, quality and price being referred to.

Accepted by G. F. H. Markoe, Boston.

37. What other alkaloids, if any, are similar to or identical with atropia?

Accepted by H. D. Garrison, Chicago.

38. Is it desirable and practicable to introduce in the revision of the Phar-

macopœia an assay morphia strength for tincture of opium, in place of the present formula yielding a product of indefinite morphia strength?

Accepted by Adolph Pfeiffer, St. Louis.

39. Eriodictyon Californicum is receiving attention for its action in lung diseases and bronchial affections. What is its therapeutical value, and to what is its activity due? Make a chemical examination of it.

Accepted by G. F. H. Markoe, Boston.

40. What is the relative therapeutic value of aloin as compared with aloes? Can the former be used as an efficient substitute for the latter?

Accepted by A. P. Brown, Camden, N. J.

The Business Committee introduced the following resolutions, which were adopted, the question on the two last resolutions being taken by Mr. Joseph Roberts:

Resolved, That the thanks of the American Pharmaceutical Association are hereby tendered to the newspapers of Philadelphia for their thorough reports of the proceedings.

That this Association thanks its Presiding Officer, the Secretary, and Treasurer for the very able manner in which they have discharged the duties of their several positions.

That the visiting members, in behalf of themselves and their ladies, do most heartily thank their Philadelphia brethren and their ladies for the very cordial reception extended to them, and assure them that they will carry home with them many pleasant recollections of their beautiful city and its inhabitants.

A motion to adjourn being made, the President said:

Before putting the motion, which will close the Twenty-fourth Session of this Association, I desire to return to you thanks for the courtesy which you have extended to me as your presiding officer. It has been very gratifying to notice the number of members who have given attention to our meetings, when we consider the outside attractions that have prevailed. You will better appreciate the work you have done after it has gone through the arrangement and digestion of the Executive Committee and Secretary. Unfortunately in that digestion they cannot receive much help from pepsin. I wish you all a safe return to your homes, the enjoyment of the blessing of health, and may we all meet again at the appointed time and place next year.

On motion of the Business Committee, the Association then adjourned, to meet again in the city of Toronto, on the first Tuesday of September, 1877, at 3 o'clock P.M.

During the meeting the following delegates became members, by signing the constitution:

Starr H. Ambler, New York.
Samuel Anderson, Bath, Maine.
Matt. W. Borland, Chicago, Ill.
Wm. E. Boutelle, Providence, R. I.
Samuel A. Cochran, Camden, N. J.
Jno. Waters Drew, Washington, D. C.
W. G. Duckett, Washington, D. C.
C. R. Dufour, Washington, D. C.
Carl D. S. Früh, Philadelphia.
A. O. Gates, Morrisville, Vt.
John Ingalls, Macon, Ga.
C. Henry Kolp, Philadelphia.
Charles Krusemarck, Chicago.
P. Wharton Levering, Jersey City.
John C. Loomis, Jeffersonville, Ind.
G. A. Mangold, Trenton, N. J.
William K. Mattern, Philadelphia.
Byron F. McIntyre, New York.
Polk Miller, Richmond, Va.
B. F. Moise, Charleston, S. C.
F. A. Morse, West Rutland, Vt.
Adolf Pfeiffer, St. Louis, Mo.
Charles S. Price, Washington, D. C.
Samuel M. Sackett, Monroe, Mich.
W. F. Scala, Washington, D. C.
Louis Schwab, Cincinnati.
William H. Stanford, Newark, N. J.
E. C. Taliaferro, Richmond, Va.
H. B. Taylor, Philadelphia.
Adolphe Tscheppe, New York.
W. J. Van Patten, Burlington, Vt.
Chas. E. Wells, Northampton, Mass.
C. G. Wheeler, Chicago, Ill.
Alonzo F. Wood, New Haven, Conn.
L. W. Yeomans, Belleville, Ont., Can.

JOHN M. MAISCH,
Permanent Secretary.

Special travelling arrangements for the twenty-fourth meeting could not be made, the various railroads throughout the country having reduced the fares to the International Exposition. Philadelphia being crowded with visitors at the time, it was impossible to secure accommodations for all visiting members at any one hotel, but the local committee had made ample arrangements to provide for their comfort, at hotels as well as at private houses.

The hall of the Philadelphia College of Pharmacy had been selected as the general rendezvous for the members and their families, and an actuary was in constant attendance to give any desired information. The entrance hall of the building had been handsomely decorated with flags of all the nations represented in the International Exposition, and opposite the entrance the following inscription greeted the visitors: "Collegium Pharmaceuticum Philadelphiense Arti Medicamentariæ operum dantes ubicumque Gentium Salutat."

The hall containing the Museum of the College was temporarily converted into a tropical garden by handsome exotics, most of which yielding medicinal products. A soda-water fountain had been placed in the same hall by Mr. Charles B. Lippincott, to furnish that refreshing beverage free of charge, the syrups having been supplied by Messrs. Hance Bros. & White.

The lower lecture-room, in which the meeting was held, was decorated with the coats of arms of the United States, the State of Pennsylvania, and the city of Philadelphia, and portraits of some of the prominent deceased members of the Association adorned the walls.

On Wednesday many of the visiting members and their ladies availed themselves of the offer of the local members to conduct them through the

Exposition. Many of the exhibitors had very obligingly offered to open, on this occasion, the cases under their charge, and thus afford an opportunity to better inspect the drugs and chemicals. Later in the afternoon, on Wednesday, about one hundred met by appointment, at the German restaurant located within the inclosure, for dinner, and all returned to the city at an early hour to rest somewhat from the fatigue, and be prepared for the reception which was tendered to the Association by the druggists, manufacturing chemists, and pharmacists of Philadelphia and vicinity.

St. George's Hall had been selected for this entertainment, at which over eight hundred persons were present. An address of welcome was delivered by the Local Secretary, Dr. A. W. Miller, and without any other formality those present enjoyed themselves, forming new acquaintances and renewing old ones. The capacious dining-rooms of the building being insufficient to hold the throng, the entire company could not at the same time partake of the refreshments provided; but while a portion did ample justice to the good things on the table, the others enjoyed themselves with dancing to the excellent music discoursed by Hassler's orchestra, many remaining until a late hour.

On Thursday, while the evening session was in progress, a party of ladies, unfortunately smaller in consequence of the rain than would otherwise have been the case, enjoyed themselves in the main hall of the College. A piano had been provided, and instrumental and vocal music was the order of the evening until it became necessary to return home, regardless of the continuing rain.

Friday was devoted by smaller parties to visit the various places from which invitations had been received; the Masonic Temple, Fox's Glass Works, and the Zoological Garden were inspected; but to many the Exposition proved to be the stronger attraction.

On Saturday afternoon at 2 o'clock nearly two hundred ladies, accompanied by the Committee on Entertainment, started from the College building in carriages for a drive through Fairmount Park, entering at Green Street and passing over Girard Avenue Bridge to Lansdowne and George's Hill, at the foot of which the Exhibition grounds are located, affording an excellent bird's-eye view of this locality, and further in the distance of the beautiful banks of the Schuylkill River, with a portion of Philadelphia in the background. The drive was resumed to Belmont, the Schuylkill recrossed at the Falls, and the romantic valley of the Wissahickon entered and followed up to near Indian Rock. On the return the party passed through a portion of the East Park to Strawberry Mansion, where a collation was served; night had set in when the excursionists returned to their city homes.

The incessant rain on the following Sunday, September 17th, made that day one of rest; but upon the following morning the sun rose upon a cloudless sky, and about ninety ladies and gentlemen went on the excursion to Mauch Chunk, passing first through a fertile rolling country to Bethlehem, from whence the road follows the tortuous windings of the Lehigh River, the valley becoming continually narrower, so that there is scarcely any room left there besides what is occupied by the tracks of two railways. In the meantime the sky had become overcast, a drizzling rain fell occasionally, and the atmosphere was quite chilly, so that the warm rooms of the Mansion House were quite inviting. After dinner the weather had become sufficiently stationary to venture on the trip to the Switchback, first in coaches through Mauch Chunk, which is located in a narrow ravine, and up a steep hill to the foot of Mount Pisgah. From here a car is drawn up an inclined plane to a height of 864 feet from its starting-point, and a foot-path brought the party then to a still higher point, where, from a rustic pavilion, a beautiful view was had over mountain tops into wild ravines, and through a portion of the narrow Lehigh Valley. Re-entering the car, it dashes along an inclined plane, propelled by its own gravity, a distance of six miles to the foot of Mount Jefferson, to the top of which, 462 feet high, it is again pulled by a stationary engine, thence to descend again through the force of its own gravity to the mining village of Summit Hill, located at an elevation of 975 feet above the Lehigh River. Here the "burning mine" and the "ice cave" were visited. The former has been burning since 1843, and, though filled in and closed soon after, smoke still issues from the ground, several acres of which are searingly hot, and vegetation upon it totally blighted. Within the distance of less than a quarter of a mile is the cave in which, during the winter, large quantities of ice are formed, much more than even the prolonged high temperature of the past summer could melt.

The descent from Summit Hill is made solely by the gravity railroad, often at a dizzy speed along high cliffs and around short curves; and after again reaching Mauch Chunk the inclement weather forbid a visit to Glen Onoko, and a return to Philadelphia on the same evening was decided upon. A delay of the train would have caused some unpleasant inconvenience if the forethought of the Entertainment Committee had not, by telegraph, provided for substantial refreshments at Bethlehem.

On Tuesday, September 19th, between forty and fifty members with ladies embarked on a steamer for a visit down the Delaware River to Greenwich Point, in the southern part of Philadelphia, where a branch of the works of the Pennsylvania Salt Manufacturing Company are located. The officers conducted the visitors over the grounds and through the buildings, and gave all facilities for inspecting the processes as carried on here, of manufacturing sulphuric acid, carbonate and bicarbonate of sodium, caustic soda, alum, and so-called concentrated alum. A trip to League Island, and, after returning to the city, a pleasant intercourse at the office of the company closed this day's proceedings, the last one in which the visitors to the Twenty-fourth Annual Meeting participated.

At a meeting of the visitors to Greenwich Point, Prof. E. Painter, of San Francisco, was called to the chair, and Prof. John M. Maisch, of Philadelphia, elected Secretary. Messrs. Charles S. Eastman, of New Hampshire, and R. V. Mattison, of Pennsylvania, having been appointed a committee, reported the following preamble and resolutions, which were unanimously adopted:

WHEREAS, Those members of the American Pharmaceutical Association and their ladies, who have this day visited the works of the Pennsylvania

Salt Manufacturing Company, located at Greenwich Point, have, with pleasure and great profit to themselves, examined the various processes carried on there; therefore be it

Resolved, That we tender our hearty thanks to the officers and managers of the Pennsylvania Salt Manufacturing Company for their courtesy and many facilities extended to us in showing and explaining the conversion of the crude materials into the finished products of their manufacture.

Resolved, That we feel greatly indebted for the generous hospitality of the officers, and for their kindness in placing a steamboat at our disposal for an excursion down the Delaware River to Greenwich Point and to League Island.

It may be stated in this connection that the Committee on Arrangements determined unanimously to devote the surplus, remaining on hand after the close of the meeting, to the foundation of a fund, the interest of which is to be expended solely for the purpose of aiding original investigations; and that this money will be formally presented to the American Pharmaceutical Association at its next annual meeting.

JOHN M. MAISCH,
Secretary.

APPENDIX.

I. PRESIDENT'S ADDRESS.*

BY GEORGE F. H. MARKOE.

GENTLEMEN: It is my pleasant duty to now fulfil the customary requirement that demands from your retiring President an address. In this address I shall be mindful of the fact that I am not expected to discuss the business affairs of the Association, and hence will seek some subject that shall be appropriate and yet not trench on the domain of those whom you have chosen to conduct the general affairs of the Association, and from whom you doubtless will receive full and satisfactory accounts as to the progress made during the past year.

The year 1876 marks an era in the history of our God-favored land, so important in its historical bearings that throughout the length and breadth of our vast domains, our statesmen, our historians, and our orators have well-nigh exhausted all the resources of language in the effort to give proper expression to the grandeur of the theme: "The centennial epoch of American independence!" Upon this sublime subject the ripest results of historical research and the most brilliant flowers of rhetoric have been lavishly used by the ablest men of our day, in the endeavor to adequately commemorate this landmark in the onward progress of the United States, that points to the completion of the first century of her national existence. One hundred years of free republican institutions, of civil and religious liberty, of steady advance in all the arts that minister to the wellbeing and happiness of mankind; of progress in popular education, in population, in wealth, and in political influence. An era that witnessed the birth of the nation, her struggle for independence, her final success, and her progress

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* The address is printed here for reasons stated on page 569.

from generation to generation, until to-day she stands foremost among the nations and assumes her rightful place in the record of the ages.

We meet to-day in this noble old city of Philadelphia, the scene of that immortal act that proclaimed to the world the independence of the American colonies from the thraldom of the mother country. No true American can walk her historic streets or enter the portals of her "Independence Hall," so happily restored and consecrated anew as a perpetual memorial of that glorious band of patriots who, on the Fourth of July, 1776, pledged their lives, their fortunes, and their sacred honor to the cause of American independence, without speaking some words of commemoration, some words of congratulation, and of gratitude to those who suffered so much and who fought so bravely, that we, their posterity, might enjoy the manifold blessings that surround us. The names of Adams, Jefferson, Hancock, Franklin, and the rest of the signers of the Declaration of Independence, will live as long as men continue to cherish the possession of unity, liberty, and prosperity; because it was their wisdom and their firmness that founded the State and guided her through the perils that on every hand beset her progress to a firm position among the nations of the earth.

That which is true of nations is also true of all the organized efforts of man. If a few wise and determined men incept and carry into successful execution any plan for the spread of education, for the alleviation of human suffering, or for the foundation of societies having for their object any form of public good, they will always be remembered with gratitude by their successors, and the record of their work given a prominent place in the annals of the bodies with and for whom they labored.

It is highly proper that we, as an association, should from time to time pause in our onward career and cast some grateful glances into the past, and acknowledge our indebtedness to those who, twenty-five years ago, proposed the plan of forming a National Pharmaceutical Association.

On the 15th day of October, 1851, at five o'clock in the afternoon, there assembled in the rooms of the College of Pharmacy of the city of New York, No. 511 Broadway, the first convention of pharmacists and druggists ever held in the United States. This convention met for the purpose of establishing a standard of purity and of quality in imported drugs and medicines, and to discuss those subjects that related to the general advance of the standard of pharmaceutical education throughout the land. To the College of Pharmacy of the city of New York belongs the credit of incepting the idea of holding such a convention, and it was upon her call that the meeting was held at the time and place already mentioned. The meeting was attended by the following delegates:

From the Massachusetts College of Pharmacy, Dr. Samuel R. Philbrick, Thomas Resticaux, Samuel M. Colcord. College of Pharmacy of the City of New York, George D. Coggeshall, Dr. C. B. Guthrie, Thomas B. Merrick. Philadelphia College of Pharmacy, Charles Ellis, William Procter, Jr., Alfred B. Taylor.

The meeting was called to order by Charles Ellis, of Philadelphia, who was chosen temporary Chairman, with Dr. Philbrick, of Boston, as Secretary. A committee on credentials and to nominate officers, consisting of G. D. Coggeshall, S. M. Colcord, and Alfred B. Taylor, reported the names of the delegates which have been mentioned, and presented the names of Dr. C. B. Guthrie, of New York, for President, and of Alfred B. Taylor, of Philadelphia, for Secretary. These gentlemen were unanimously elected to fill the offices for which they had been nominated.

Dr. Guthrie, on taking the chair, alluded to the circumstance that it was the first convention of the kind that had been held in the United States, and then briefly stated the objects for which the meeting had been called, which were the adoption of a series of standards for the use of the drug inspectors at the different ports of entry, whereby their action might be rendered more uniform and satisfactory, as well as the proposal of any measures that might be calculated to elevate the profession, and promote their interest throughout the country. Papers were received and read from the New York College of Pharmacy, the Boston Drug Inspector, from the Cincinnati College of Pharmacy, from the Drug Inspectors of Baltimore, and also a paper on the subject of standards, by Prof. William Procter, Jr., of Philadelphia. The several communications were referred to a committee with instructions to report at the next session a plan of action for the convention to adopt. This committee consisted of William Procter, Jr., George D. Coggeshall, and Thomas Resticaux, who presented their report at the second session, October 16th, 1851, which after a very full discussion, was finally adopted in an amended form, and ordered to be printed. It is sufficient to say that the convention put itself squarely on record as being in favor of high standards of purity and quality in drugs and medicines, and expressed itself strongly in the opinion that the time had arrived for the formation of a National Pharmaceutical Association, having for its aim the improvement of the practice of pharmacy, the regulation of the system of apprenticeship, the encouragement of pharmaceutical research, and the advancement and extension of organized systems of pharmaceutical education; and finally, the convention determined to issue a call for a meeting to take place in Philadelphia, October 6th, 1852, in the hall of the Philadelphia College of Pharmacy. Thus was the first step taken in the formation of this Association, and now, after the lapse of one-fourth of a century, it is eminently appropriate that we should be reminded of the heavy debt of gratitude that we owe to the little band of nine earnest men, who so wisely planned and so well executed their work that the flight of years has only served to build up and strengthen the structure, the foundations of which they laid so surely. At the time announced in the call for the reassembling of the convention in Philadelphia, the meeting was duly opened in the hall of the Philadelphia College of Pharmacy (Zane Street above Seventh), with the following gentlemen present as delegates:

Massachusetts College of Pharmacy, Joseph Burnett, S. M. Colcord, S. R. Philbrick. College of Pharmacy of the City of New York, George D. Coggeshall, L. S. Haskell, John Meakim. Philadelphia College of Pharmacy, Daniel B. Smith, Charles Ellis, William Procter, Jr. Maryland College of Pharmacy, David Stewart, George W. Andrews. Richmond Pharmaceutical Society, Alexander Duval, John Purcell, Joseph Laidley. Cincinnati College of Pharmacy, William B. Chapman, Charles Augustus Smith, E. S. Wayne.

As representative of the pharmacists and druggists of Hartford and Middletown, Conn., Henry F. Fish.

From the first the convention adopted a very liberal policy, for one of its earliest acts was to invite all interested in the objects of the meeting to take seats in the convention, and to participate in its deliberations.

Charles L. Bache, of San Francisco, California, Eugene Dupuy, of New York, Edward Parrish, of Philadelphia, were among the first to accept the invitation. The following list of officers were nominated and elected:

President, Daniel B. Smith, of Philadelphia. Vice-Presidents, George W. Andrews, of Baltimore; Samuel M. Colcord, of Boston; Charles Augustus Smith, of Cincinnati. Recording Secretary, George D. Coggeshall, of New York. Corresponding Secretary, William Procter, Jr., of Philadelphia.

The committee appointed at the convention held in New York, October, 1851, which had been charged with the duty of collecting information, memorials, and suggestions from medical and pharmaceutical associations, made an able and very comprehensive report. I take a few of the leading points to illustrate its drift. It urged the necessity of adopting measures to unite the druggists and apothecaries of the United States into a National Association, whose members, coming from all sections of the country, would be led to foster feelings of strong friendship for each other, to band themselves into a brotherhood pledged to use their influence to elevate the standard of qualification then existing for the practice of pharmacy. The report called attention to the inadequacy of the basis of merely admitting delegates from incorporated and unincorporated societies, inasmuch as it limited the scope of the useful results. The aim should rather be to enlist all the talent possible from the entire pharmaceutical ranks; this object to be attained by making the Association as fully representative as practicable by admitting delegates from local pharmaceutical bodies, and by admitting to membership all apothecaries in good standing who might desire to join the Association. They recommended the formation of a constitution and the preparation of a code of ethics, stringent enough to elevate the members above the abuses then common in the drug trade, yet not so binding as to exclude many well-disposed men who were unable to reach the highest standard, without a greater sacrifice than could be asked of them. The subject of pharmaceutical education was stated to be of the utmost importance, being in fact the primary object for which the convention was called; because the project of improving the practice of pharmacy throughout the country could only be accomplished by extending the means of education, by the aid of schools and by leading proprietors, to give their apprentices and assistants increased facilities for study and practice. Schools of pharmacy being of gradual growth, and capable of being maintained only in large cities, the committee argued that the convention would do well to use its influence in leading the proprietors in small towns to form local associations, which would tend to the formation of pharmaceutical libraries, to improve the practice of our art, and to the use of pure drugs. The system of apprenticeship which then prevailed was brought forward as well worthy the attention of the convention, and suggestions were given for its improvement. The subject of quack medicines was discussed, and also that of the inspection of imported drugs, with regard to the rejection of spurious or adulterated articles. This report was signed by William Procter, Jr., Samuel M. Colcord, and George D. Coggeshall, and was referred to a Business Committee, who were charged with the duty of duly considering the subjects brought forward in the report, together with any other matters they might deem expedient to be reported at the next sitting. The first session closed by the passage of a resolution, offered by Prof. Procter, inviting all pharmacists interested in the proceedings of the convention to attend its deliberations. A special invitation was tendered to Professors George B. Wood, M.D., Franklin Bache, M.D., Joseph Carson, M.D., and to the professors of the Philadelphia College of Pharmacy, to be present at the sittings of the convention.

The second sitting opened at 10 A.M., October 7th, with a full attendance of the delegates. The Business Committee reported a draft of a constitution and of a proposed Code of Ethics. An animated discussion ensued on the drafts presented, the special point of interest being the question as to what should be the position of the convention in regard to the classes of members to be admitted. On one side were those who maintained that the membership should be limited as far as possible to those connected with local societies, and in those places where no such organizations existed to require every member to bring credentials from the practicing pharmacists of the locality. It was maintained in favor of this view that this requirement would be a powerful incentive to form local organizations; while if the door was widely opened for the admittance of all who might seek to join the Association, it might result in the ingress of undesirable persons.

On the other side were those who believed that the general condition of pharmacy in the United States was such as to allow the adoption of a liberal basis of membership. They had faith enough in the good intentions of the great mass of apothecaries and druggists to allow the doors to be open to all who could bring certificates of their good standing at home, and who were ready, after due consideration, to subscribe to the constitution and "Code of Ethics." The delegates were regarded as having a twofold capacity, first, as representing the interests of their institutions in any movements of the National Association affecting them; and, second, as individual members of that Association, looking only to the general advancement of the pharmaceutical profession. They therefore urged that the Association should be independent of all local societies, while the latter could of course act in and with the Association, through their delegates, if they desired to do so. They had full confidence in the wisdom of adopting a very liberal policy, and gave expression to the opinion that the difficulty would be, in practice, that too few, rather than too many, would avail themselves of the invitation to become active members of the Association. The arguments of the liberal party prevailed, and the constitution and the Code of Ethics, that have worked so well in practice up to the present time, were adopted, and the convention formed itself into the American Pharmaceutical Association.

The third session, October 7th, 4 P.M., was occupied with discussion of the working of the drug law as enforced at the several ports of entry. Reports were received from M. J. Bailey, M.D., Special Examiner of Drugs for the port of New York, detailing the character of imported drugs coming under his observation, and on the general working of the law. A similar report was received from Mr. Edward Hamilton, late examiner for the port of Boston. Dr. Stewart, examiner for the port of Baltimore, opened the debate, his argument being that all varieties of drugs "that are good of their kind" should be admitted by the special examiners of drugs and medicines, on the ground that an inferior variety might have merits of its own, and so ought to be admitted, even if it could be substituted for a higher grade. In illustration he cited the cheap varieties of Peruvian bark, which, though inferior to the best Peruvian bark, were yet useful and capable of application in medicine. Professor Carson stated that many of the Carthagena and Maracaibo barks possessed decided medicinal virtue, that several kinds of European rhubarb were of value in medicine, especially in times when the officinal varieties were scarce, and hence he thought that these drugs should all be admitted when not deteriorated or adulterated. Mr. Haskell, of New York, and Mr. Fish, of Connecticut, also spoke in favor of this side of the question. Mr. Coggeshall, of New York, on the other side, called attention to the item in Dr. Bailey's report, showing that three hundred thousand pounds of poor barks had been rejected at the port of New York in about two and a half years. He stated that there was no legitimate demand for it there, was not used in the manufacture of alkaloids, that the pretext of its use in tooth-powders would not account for the great consumption of it, and hence the query arose, For what purpose was it imported? Mr. Coggeshall asserted that it was used for the adulteration of powdered Peruvian bark, for the preparation of cheap extract, which was sold at a large profit under the name of the true officinal article. So well assured was he of the bad uses to which these false barks were put, that, as a protective measure, they should be excluded from the market. The argument in favor of English and European rhubarb he said would not hold good, because the markets were plentifully supplied with the Russian and Chinese rhubarbs, in comparison with which the Banbury, the best variety of the European rhubarbs, was very inferior. Another good reason why these European rhubarbs should be rejected was because they were exceedingly well adapted for general use, because they had a fine color, which made it easy for the dishonest drug grinder to improve the appearance of poor grades of Chinese rhubarb, or to mix them with the dear Russian article, in powder, without injury to its appearance, or even, as was often the case, to substitute it for the genuine article.

Mr. Colcord of Boston, earnestly sustained the views of Mr. Coggeshall, and hoped the "good of its kind resolution" would not pass. After a prolonged debate, Dr. Stewart's resolution was lost, and the American Pharmaceutical Association at the onset of its career, put itself on record in favor of maintaining high standards of quality in imported drugs. It is interesting in this connection to note how well the American rhubarb has worked into use, as a means of imparting a fine color to inferior powdered rhubarb, serving the unscrupulous drug grinder of to-day the same useful end, that those of former times gained by the use of the cheap, bright colored English rhubarb. Before the Association adjourned, resolutions were passed pledging its influence in favor of the strict enforcement of the law against the importation of adulterated drugs, chemicals, and medicines, of using all proper means to prevent the removal of qualified examiners on merely political grounds. Resolutions were also passed and committees appointed to take into consideration the matter of the "sale of poisons," with a view to find some practical way of preventing the indiscriminate sale, then so common. Pharmaceutical education and its extension by means of schools of pharmacy was discussed at length, and resolutions were passed, giving valuable suggestions to the apothecaries of the United States as to the importance of selecting for apprentices only those who, by natural endowment and by careful preliminary education, were fit to undertake the study of the responsible duties devolving upon the practice of pharmacy.

The result of the Philadelphia meeting was eminently satisfactory to those who incepted the plan of forming a National Pharmaceutical Association, indeed, the preliminary convention in New York, and the accomplishment of the plans there proposed at the subsequent meeting in Philadelphia, mark an era in the history of American pharmacy, that stands in relation to our profession much in the same light that the Declaration of American Independence, and its successful accomplishment by the fathers of the republic, does to the present wonderful prosperity of our country. The result of these two meetings were in fact the Declaration of Pharmaceutical Independence from the thraldom of ignorance, from the blasting influence of dishonesty in business dealing, and from the influences that tend to lower the moral tone and debase the practice of our art. All honor to the men who so devotedly bent their energies to the work of elevating our profession, by inculcating the importance not only of faithfulness in the discharge of our every-day duties to the public, but likewise to induce all who enter our ranks to press on in the endeavor to reach the higher walks of our art, and to stimulate them to extend the domain of pharmacy by original investigations into the vast realms of the unknown. The founders of the American Pharmaceutical Association have worthily earned the right to be held in grateful remembrance by all who now constitute her membership, and by those who in their turn shall follow us.

I will not weary you by following the progress of the Association through the years that have passed since the first meeting in this city, because the records are open to your inspection, and you can peruse them at your pleasure. Twenty-five years have passed away, and to-day the American Pharmaceutical Association has reached a degree of influence, a strength of membership, and an enlarged field of usefulness, that could scarcely have been anticipated by those who so wisely and so patiently laid the foundation upon which these grand results have been built. The present condition of our Association and her future progress in the noble work she has undertaken, will be a lasting memorial of the wisdom and the self sacrificing devotion of its founders to the cause of pharmaceutical progress. God grant that the American Pharmaceutical Association may never lose sight of her true mission, but that she may always press on in the good work of extending the benefits of education to all who seek to join the pharmaceutical ranks, until through her influence our science and our art shall attain their true place among the avocations, in which there is no place, save for the faithful and intelligent discharge of the responsible duties connected with the relief of human suffering.

Death has been busy in our ranks, and Carney, Meakim, Milhau, Bringhurst, Ellis, Parrish, and last and greatest of them all, the beloved Procter, have all gone to their long home. Others more able have written loving testimony to their virtues, and their unselfish labors in our behalf. They rest from their lifelong toils, but to us they will always live in the noble record they have left for our guidance. If we emulate their example, the future of the American Pharmaceutical Association will be yet more brilliant than its past.

REPORT OF THE COMMITTEE ON THE CENTENNIAL EXHIBITION.

YOUR committee, to report upon the objects of Pharmaceutical Interest at the International Exposition held at Philadelphia, appointed at the last meeting, have been engaged with the labor connected therewith during the last two months. The task was not devoid of difficulty, owing principally to the immense number and variety of objects, and secondarily to the scattered locations of most of them.

In order to facilitate the presentation of matter which would be of particular interest to the Association, and to ascertain the special points of excellence claimed by the various firms displaying their goods, the following circular-letter was addressed to foreign and home exhibitors:

SPECIAL NOTICE TO EXHIBITORS

OF

DRUGS, CHEMICALS, APPARATUS USED IN PHARMACY AND CHEMISTRY, PERFUMERY, ETC., ETC.

At the Twenty-fourth Annual Meeting of the American Pharmaceutical Association, which has just completed its deliberations at Philadelphia, the undersigned were appointed a committee to prepare a report on those objects exhibited at the International Exhibition which had a relation to Pharmacy.

This report when completed is to be embodied in the forthcoming volume of the official Proceedings of the Association, which will be published in a few months. In this form it will be permanently available to all who are interested in it.

It is the earnest desire of the committee to make the report as accurate and comprehensive as possible.

With this object in view, you are requested to furnish, with as little delay as possible, a full list of the goods exhibited by your firm, a statement of any special merit which you may claim for them, accounts of their production or manufacture, description of the sources whence derived, or any particulars of interest that may be suggested.

We feel convinced that it will be of great advantage to comply promptly with our request, inasmuch as descriptions of the objects of the kind mentioned will thus be placed permanently on record and come before the notice of many who are deeply interested in them.

It will perhaps be unnecessary to state that we cannot insert mere advertisements, although descriptive circulars, etc., may be of benefit to us in compiling the report.

Signed by the committee.

Notwithstanding the caution contained in the last clause of the notice, very much information was sent in reply which could but be regarded as purely of an advertising character, yet the labors of the committee have been lightened by many of the communications sent, and by culling out the objectionable passages, the report has been rendered less cumbersome, and we trust more valuable.

On account of the delay in receiving answers to the circulars, it will be necessary to issue a supplementary report, which will be presented to the Association at its next meeting, in Toronto.

The thanks of the committee are due the commissioners from the various countries for the special catalogues of articles exhibited, which have been of great service in compiling the report.

The plan of classification adopted is to divide the subject into five heads, viz.: 1. Drugs. 2. Chemicals and Preparations from Inorganic Kingdom. 3. Pharmaceutical Preparations. 4. Essential Oils, Essences, etc. 5. Apparatus, Shop Furniture, etc., etc.

The order in which the names of the exhibitors appear is the same as was selected by the United States Centennial Commission, in compiling the official catalogue, each firm being noticed under their respective nations, in the following order: United States, Great Britain, New Zealand, New South Wales, Victoria, South Australia, Cape of Good Hope, Jamaica, Bahamas, Bermudas, British Guiana, Ceylon, Straits Settlements, Gold Coast, Mauritius, Queensland, Seychelles Archipelago, Tasmania, Trinidad, India, Canada, France, Germany, Austria, Switzerland, Belgium, Netherlands, Netherlands E. I. Colonies, Denmark, Sweden, Norway, Italy, Egypt, Tunis, Orange Free State, Luxemburg, China, Japan, Hawaii, Brazil, Argentine Republic, Chili, Peru, Mexico, Liberia, Spain, Philippine Islands, Portugal, Turkey, Russia.

I. DRUGS.

DRUGS FROM THE UNITED STATES.

Indigenous and other drugs. B. O. & G. C. Wilson, Boston, Mass. This firm have not the most extensive, but the finest and most carefully selected collection of indigenous drugs on exhibition. They are shown loose, in boxes, and also pressed; in their latter state the structure and character of the drug is not marred, as they would be if forced into small bottles, but the leaves, flowers, barks, etc., are in large pieces, and the quality can be seen at a glance. The most striking samples shown were Mallow Flowers, Scullcap, Vervain, Arnica, Marigold, Life-everlasting, Thyme, Rue, Goldthread, Hollyhock, Rose Leaves, Bittersweet Bark, Horehound, Grindelia, Jaborandi, Century, White Bryony, Prickly-ash Bark, Sassafras Pith, Elm Bark, Tansy, Uva ursi, Canada Snakeroot.

Indigenous drugs, Wallace Brothers, Statesville, N. C. The largest collection of drugs and plants in the Exhibition, *seventeen hundred and thirty-nine* varieties being represented: 265 varieties of materia medica fruits, 80 of flowers, 137 of wood, 602 of plants, 199 of mosses, 400 of crude substances. The labor of collecting, drying, preserving, labelling, etc., etc., this immense cabinet must have been wonderful. The drugs, whilst not exhibiting the finish and careful garbling as in the preceding exhibit, are nevertheless good commercial specimens, and many are of superior quality.

Licorice Root and Extract Licorice, Mellor & Rittenhouse, Philadelphia, the latter of their own manufacture. This was shown in mass and in sticks, and has frequently obtained the most favorable criticisms as to quality.

Ground and Powdered Drugs, McIlvaine Bros., Philadelphia. An extensive collection of drugs, powdered, ground, bruised, and cut.

Powdered Drugs, Hagner Drug Milling Company, Philadelphia. This concern show an immense variety.

Indigenous Crude Drugs, Pills, Syrups, Elixirs, Perfume Extracts, etc., McKesson & Robbins, New York.

Drugs, Preparations, Lewis U. Bean, Philadelphia, Paints, dry and in oil, etc.

Isinglass, Gelatin, etc , John S. Rogers, Gloucester, Mass.

Isinglass, C. Norwood & Son, Ipswich, Mass.

Glue, Wahl Brothers, Chicago, Ill.

Isinglass, Russian (?), Gustave Muller, Chicago, Ill.

Refined Leaf Lard, G. C. Napheys & Son, Philadelphia, Pa.

Gelatin, James Chalmers & Sons, Williamsville, N. Y.

Refined Leaf Lard, Lard Stearine, Lard Oil, W. J. Wilcox & Co., New York.

Egg Albumen, Stein, Hirsh & Co., Chicago, Ill., prepared by carefully evaporating the albumen of eggs, and occurring in thick scales, which have the characteristic taste of white of egg.

Glue, W. H. Brown, Peabody, Mass.

Glue, Neat's Foot Oil, Franklin Glue Works, Pittsburg, Pa.

Glue in Sheets, Broken, Ground, and Powdered, George Upton, Boston, Mass.

Glue, Gelatin, etc., Peter Cooper's Glue Factory, New York.

Glue, Tallow, etc., Lister Brothers, Newark, N. J.

Refined Lard, Cassard Brothers & Co., Baltimore, Md.

Glue, Elijah W. Upton, Peabody, Mass.

White Mountain Honey, W. C. Harbison, New Castle, Pa.

Fruit Honey, Lewis Hurd, Kewanee, Ill.

Sunbleached Wax, Joseph Fritsch, Carlstadt, N. J., for which he claims perfect purity and good quality.

Gelatin, C. J. Fell & Bro., Philadelphia, of excellent quality in shreds. This firm also exhibited a large and valuable collection of Spices. Penang Cloves, Amboyna Cloves, Bencoolen Cloves, Java Turmeric, China Turmeric, Bengal Turmeric, Mother Cloves, Bleached Cochin Ginger, Scraped Borneo Ginger, Calcutta Ginger, Washed Cochin Ginger, Rough Cochin Ginger, Bleached Jamaica Ginger, Unbleached Jamaica Ginger, Ceylon Cinnamon three qualities, China Cassia, Java Cinnamon, Malabar Cinnamon, Cassia Vera, Batavia Cassia, Cassia Buds, Saigan Cassia, Liberia Pepper (Red), Zanzibar Pepper (Red), Jersey Pepper (Red), Singapore White Pepper, Selligherry White Pepper, Sumatra Pepper, Long Pepper, Penang Nutmegs, Banda Mace, Mustard in many varieties, etc., etc.

English-grown Drugs, Rufus Usher, Bodicote, near Banbury, Oxon, England. Specimens of English Medicinal Rhubarb Trimmed, Extract of Biennial Henbane, and Dried Biennial Henbane Leaves. Also photographs of Biennial and Annual Henbane Plants.

Powders, Extracts, etc., Evans, Lescher & Co., London, England. Concentrated Liquid Extracts, Selected Powdered Drugs, Gums, Oils, Lime-juice, etc.

Fat Products, Price's Patent Candle Company, London, England. Paraffin, Stearin, Fatty Acids, Machinery Oils, Soaps, Glycerin, Candles, etc.

Wax and Wax Substitutes, J. C. & J. Field, London, England. Wax, Spermaceti, Ozokerit, Paraffin, and Self-fitting Candles, United Service, and all qualities of Toilet Soaps, Beeswax, and Refined Yellow Wax, with White Wax, Dyer's Soaps, Sealing Wax, and Fancy Ornamental Candles. Night Lights, and the Patent "Lychnophylax" or Candle Guard, for effectually preventing the guttering of candles.

East India Products, J. Forbes Watson, Director of the Indian Museum. A remarkably rich collection of the products of India, scientifically arranged in a series of glass-topped boxes.

DYES AND COLORS.

Gamboge (Garcinia Morella), Bombay. Indigo, Indigofera Tinctoria, S. Arcot Moorshedabad, Madras Shikarpore.

The history of the commerce of this substance would be eminently interesting, but it is impossible to enter on the subject here. On its first introduction into Europe it was almost driven out by the bitter intolerance of persons whose object was to prevent the old-fashioned *woad* (then in use as much as indigo is now) from being driven out before it. In 1557, at Frankfort, it was denounced by the Germanic diet as the "Devil's Dye," and its use forbidden.

In England, an act was made in Elizabeth's time authorizing the seizure and destruction of the offensive substance, as well as the detention of persons possessing it. The act continued in force till the reign of Charles II, and "Brazil-wood" shared the odium with it.

Indigo is known in two forms, white indigo (Indigogene), and blue indigo, the latter being only an oxidized state of the former. The blue color is entirely due to the oxygen, or at least comes to the substance as it gets access to the oxygen of the air; this is observable in the vats. When the fermented liquor or infusion of the plant first ferments with the appearance of whitish-gray bubbles, afterwards these become blue, and finally a deep metallic-lustred purple-red. Dyed cotton, when just taken out of the dyeing vat, appears green, but rapidly assumes its deep blue tone from contact with the air. Blue indigo is perfectly insoluble in water, but it is found that it is so only so long as it retains its excess atom of oxygen. If it can be induced to part with that, the remaining indigogene is soluble in an excess of sulphate of lime, or rather alkali. Hence, for cotton dyeing, the vat is prepared by grinding up a quantity of indigo with water to the consistency of cream, and then mixing it with copperas and an excess of lime or alkaline water. The oxygen of the indigo then combines with the protoxide of iron in copperas to form oxide, and then the deoxidized indigo readily combines with the lime-water, forming a yellowish-green liquid, into which the fabric to be dyed is plunged; and then, being taken out and exposed to the air, the oxygen returns to the solution with which the fabric has been saturated, and the deep blue is restored and becomes permanent without the use of any mordants. The dye applied in this manner is used cold. According to the plan adopted by native dyers, "chunám," "sajji" (crude potash), and "gurh" (molasses) form the solvent and deoxidizing agents; otherwise the process is identical. They do not use copperas, though they have it in plenty in the form of "lúra kasís," or "kalú safed." Wool and silk are not dyed in this way, but in another manner, taking advantage of another property of indigo. Pure indigo is soluble in sulphuric acid, but the solution is thick and black. This has been called *cœruleo sulphuric acid*, *sulphindylic acid*, etc. ("murabba" in Urdú), because it has the nature of both the indigo and the acid, neither undergoing the slightest change in itself. This latter substance is not a sulphate of indigo; that would imply a chemical combination between the acid and the dye, and the formation of a new substance, but it is not so. The acid and indigo combine, but neither is changed. This solution is capable, however, of destruction by an excess of caustic alkali, and turns by it to a yellow color, from which nothing will restore it.

This sulphindylic acid is principally employed in dyeing wool and silk, and the excess of acid is removed by washing in alkali.

Chemically pure indigo is of specific gravity 1.50, and possesses neither taste nor smell; it is a substance "indifferent," having neither acid nor basic properties. Good indigo is known by its fine purple-blue color, and by its fracture, which when rubbed with a hard smooth substance exhibits a coppery red lustre. No remarks need here be added on the manufacture of indigo. The ordinary processes of fermentation, of drawing off the liquor, of beating, and of collecting the "fecula," or precipitate of indigo, from the liquor and pressing it, are universally well known, and are followed with but trifling variations in different provinces and different manufactories.

The main points appear to be, the watching the soaking plants so as to be able to tap off the infused liquor exactly at the right point of fermentation, and next, to beat the liquor in the second vat exactly long enough. No doubt in these points the native manufacturers in this province are as yet eminently deficient. Knowledge of these things can only be acquired by careful observation and long experience. Another point is, that the "fecula" is much improved, after being collected, by being boiled in copperas, and then pressed into its boxes.

Indigo manufactured by simply collecting the fecula, and dropping it down in cakes to harden in the sun, is termed "*gaud indigo*."—*Baden Powell's "Punjaub Products*."

Cutch, four samples (Acacia catechu), Calcutta, Madras, Burmah. Gambier, two samples (Nauclea gambir), Bombay, Malacca. Lac dye (in cakes), Jubbulpore. Lac dye (in cakes), Malwa.

DYE WOODS.

India produces a large variety, and amongst them the most valuable of organic materials for the use of the dyer. Those which are not indigenous have been introduced with success, and when we name indigo, cutch, madder, sappan-wood, safflower, mangrove bark, nutgalls, myrobalans, and many others, it will be judged that our "Empire in the East" has great resources in dye stuffs. The collection sent to the present Exhibition is neither large nor numerous, but it is useful as an indication of the resources at command.

Sappan-wood, Cæsalpinia sappan. Wood of Morinda tinctoria, Madras. Jack-wood, Artocarpus integrifolia. Cutch-wood, Acacia catechu, Shahjehanpore. Avarum Bark, Cassia auriculata. Bark of Cassia fistula, Cuttack. Two samples of Mangrove Bark, Rhizophora sp., Burmah and Singapore. Aroogay Bark, Madras. Sambooram, Sindh. Babool, Acacia arabica. Pupli, Ventilago maderaspatana, Madras. Chay-root, Hedyotis umbellata, Nagpore. Two samples Aal-root, Morinda citrifolia, Central India.

The principal trade of Kotra in the Jaloun District is in the dye from Aal (Morinda citrifolia). The best soils for Aal are:

Mar,	Black soil.
Kabur,	" " with more clay.
Perooa,	A reddish sandy soil.

The rate per acre is:

Mar,	Rs.	2	8	0
"		2	0	0
Kabur,		1	0	0
"		0	12	0
Perooa,		0	8	9

The seed of the Aal is sown in July. The land is first ploughed, then raked by the naked harrow called *bakkar*.

The seed is then sown broadcast; to one beegah of land one maund of seed is given. The plant begins to show in one month, or in August.

It is weeded in September, October, and November following.

In the following July the soil round tho young plants is turned up to allow them to grow and receive the rains.

The second year it flowers in August and September. The flower is white and sweet-smelling. The yield per beegah of seed is in the first year about 20 seers, and the two following years only 10 seers. The third year the plant is dug up. The roots go down about three feet. All other parts of the plant are of no use.

The roots are dug up in December, January, February, as may be required. The yield in roots per beegah is five maunds.

The roots are divided into three distinct sorts:

1st. The best is the thinnest, called *bhárá;* found at the greatest depth. The yield is about one maund, valued at Rs. 8 per maund in the market; formerly it fetched Rs. 20 per maund.

2d. The next size is called *jhurrum.* The yield is about 2½ maunds per beegah. It now fetches in the market Rs. 4 per maund. It formerly sold at Rs. 10.

3d. This sort is thickest, is called *ghattea.* The yield per acre is about 1½ maunds. It sells now at Rs. 8 per maund; formerly it fetched Rs. 9.

The three sorts are mixed in the following proportions:

1st sort, ...	1¼ seers.
2d "	2 "
3d "	3 "

Then chopped up fine; then ground in a hard mill; and for each seer of root 2 ounces of alum are added. All are put into a vat holding 2½ maunds, or 28 gallons of water.

The cloth to be dyed is first washed. To one *than* (piece) of cloth, a quarter seer of castor oil and a quarter seer of fuller's earth (sujjee) are used, with four seers of water, in which it is well stamped upon by the cheepee (cloth printer). The cost of this process by the cheepee is 3 pie per "*than*" of 8 yards.

In the root mixture above mentioned, fine *thans* of white country-made cloth called *pátul*, or fine *thans* of *mirkhani*, a better sort of cloth, are put, and allowed to remain for eight days. The cloth is moved up and down to make the dye equal throughout. After this the cloth is taken out, washed, and dried in the sun, and pressed.

The present market price of *pátul* is Rs. 1-8-0 per *than* of 87 yards, *mirkhani* is Rs. 2 per *than.* A profit of 2 annas per *than* is generally made in the markets of Hatrass, Pilibheet, and Lucknow. These cloths are used by women as head-coverings.

Munjeet, Rubia cordifolia, Nepal, Assam, and Bengal. Munjeet, Rubia munjista, Bombay. Madder, Rubia tinctoria, Madras. Four samples of Turmeric, Curcuma longa, Dehra-Doon, Bombay, Bengal, Bimlipatam. Sample of Round Turmeric, Curcuma longa, Madras. Sample of Bengal Turmeric, Curcuma longa, Calcutta. Sample of Ground Turmeric, Curcuma longa. Mara munjel, Coscinium fenestratum. Rutanjot, Onosma echioides, N. W. Provinces.

Green Dye, Jatropha, Malda. Henna, Lawsonia inermis. Usburg, Delphinium sp., Lahore. Sumac, Rhus sp., Cawnpore. Dhawa flowers, Grislea tomentosa, N. W. Provinces. Palas flowers, Butea frondosa, Burmah. Palas flowers, Butea frondosa, Ahmednugger. Eight samples of Safflower, Carthamus tinctorius, from Indore, Burmah, Hyderabad, Hooghly, Moorshedabad, Sarum, Dacca, Ahmednugger. Ball Safflower, Carthamus tinctorius. Hursinghar, Nyctanthes arbor tristis, Madras. Divi Divi, Cæsalpinia coriaria, Cawnpore. Marking nuts, Semecarpus anacardium, Burmah. Kamala, Mallotus philippinensis. Aomla, Emblica officinalis, Bombay. Three samples of myrobalans, Terminalia chebula, Bombay, Calcutta, Bengal. Beleric myrobalans, Terminalia belerica, Madras. Crushed myrobalans, Terminalia chebula, Cawnpore. Usneb, Parlia perlata, Umritsur. Chulcheleera, Parmelia, Kamtschadalis, Bengal. Orchella, Roccella fuciformis, Travancore. Mochurrus, Areca Catechu, Bombay. Blue Galls of Quercus infectoria. Galls of Terminalia chebula. Tamarisk Galls, Tamarix furas, Bombay. Pulas Kino, Butea frondosa.

GUMS AND RESINS.

Five samples of Sal Dammar, Shorea robusta, from Central Provinces, Raepore, Gyah, Burmah, Chota, Nagpore. Six samples of Black Dammar, Canarium strictum, from Madras, Coorg, Salem, Burmah, Cochin, I. Pwai Nyet, Canarium strictum? Burmah. Thingan, Hopea odorata, Pegu. Resin, Hardwickia binata, Salem. Dhoop Resin, Vateria Indica, W. India. Five samples of Piney Resin, Vateria Indica, from Mysore, Bangalore, Madras, Travancore. Salai, Terminalia sp., Berar. Olibanum, Boswellia Bhaudagiana, Bombay. Myrrh, Balsamodendron myrrha, Bombay. Jalmaram Incense, Salem. False Benzoin, Terminalia angustifolia, Bombay. Muttipal, Ailanthus Malabarica, Bombay. Dika Mali, Gardenia gummifera, S. India. Assafœtida, Narthex assafœtida, Bombay. Two samples of Mysore Gamboge, Garcinia pictoria, Bombay. Palas Kino, Butea frondosa, Central Provinces. Banapú, Terminalia tomentosa, Madras. Kino, inferior, Pterocarpus marsupium, Madras. Kino, Pterocarpus marsupium, Madras. Vengaygum, Pterocarpus marsupium, Madras. Khaira, Sterculia urens, Indore. Karree Gum, Sterculia urens, Central Provinces. Two samples of Kuteera Gum, Sterculia urens, from Indore and Central Provinces. Kicteera, Cochlospermum gossypium, Madras. Two samples of Babool, Acacia Arabica, from Baroda and Central India. Four samples of Babool Gum, Acacia Arabica, from Calcutta, Gyah, Salem, and Central Provinces. Kheir, Acacia catechu, Madras. Three samples of Kheir Gum, Acacia catechu, from Central Provinces, Goonah, Chutterpore. Caroo Velai, Acacia sp., Madras. Velai Gum, Acacia leucophlœa, Madras. Velai Gum, Acacia odoratissima, Salem. Gum of Melia azedarach, Salem. Wood-apple Gum, Feronia elephantum, Madras. Woodier Gum, Odina wodier, Central Provinces. Two samples of Woody Gum, Odina wodier, from Bengal, N. W. Provinces. Dowra, Conocarpus latifolia, Ahmedabad. Kuthlia Gum, Indore. Veckale, Conocarpus latifolia, Madura. Two samples of Dinduga, Conocarpus latifolia, from Salem and Madras. Two samples of Dowra, Conocarpus latifolia, from Goonah and Central India. Two samples of Chironjee, Buchanania latifolia, Central Provinces and Madras. Gum of Chironjee, Buchanania latifolia, Berar. Moorkalee Gum, Salem. Marking-tree Gum, Semecarpus anacardium, Salem. Gum of Macaranga tomentosa, Madras. Kattimandu, Euphorbia cattemandu. Panchontee, Bassia elliptica, Madras. Coorta Gum, source uncertain. Gutta-percha, Isonandra gutta, Malacca.

These products have as yet not been fairly and completely sought out and developed in India. The supply could doubtless be very large, but so long as indiscriminate mixing and careless collection is the rule rather than the exception, the gums and resins of Indian forests will fail to secure a remunerative market.

Stick lac, from various parts of India and Burmah. Cake lac, Bombay. Grain lac, Mirzapore. Seed lac, Mirzapore and Central India. Flake lac, Bengal. Shell lac, Mirzapore, Bengal. Silk lac, Jubbulpore.

Stick lac consists of the resinous incrustation formed by the female lac-insect upon the small branches of various trees and shrubs, being found abundantly throughout most of the forest districts of India and Burmah.

SPICES.

Spices are very extensively employed in the cooking operations of Oriental nations, including many which are scarcely known in that character in the West. This is the case especially with the carminative seeds, such as coriander, caraway, etc., which we are not accustomed to see in company with mustard and pepper, but are associated with them in the Asiatic *cuisine.*

Pepper, white and black; six samples (Piper nigrum). Bombay, Travancore, Oudh, Bengal, Penang.

Consists of the dried berries of a climbing plant, which is indigenous to the forests of Malabar and Travancore. The pepper vine is propagated from cuttings or suckers, laid down at the commencement of the monsoon, in a rich and tolerably moist soil. In three years it begins to bear, each plant yielding on an average 1½ lbs. of pepper per annum. The crop is gathered in March and April. The fruit is plucked when not quite ripe, and dried on mats in the sun. White pepper differs from black only in being deprived of the outer skin by a short maceration in pure water, and subsequent gentle rubbing. In North Canara it is most successfully grown *above* the ghauts, although it succeeds well below. An acre of land will bear 2500 plants, and as they require little care, the cost of cultivating and bringing into bearing one acre does not exceed 40 rupees at the most, and as the annual yield when the plants come into bearing is worth upwards of 800 rupees, the investment is a very profitable one.

Long pepper. Bombay. Red pepper, two samples. Indore and Dehra Doon. Mustard, ten samples (Sinapis sp.). Berar, Maunbhoom, Sarun, Chittagong, Oudh, N. W. Provinces, Punjab, Sind.

The seeds of several species or varieties of *Sinapis* are employed in India. It is scarcely possible to determine the species or varieties from the seeds themselves, hence they are grouped together under the above general heading. Probably a large proportion may be referred to *Sinapis juncea.* Oil is also expressed from these seeds to a considerable extent, and they appear again under the heading of Materia Medica.

Ginger, five samples (Zingiber officinalis). Oudh, Bengal, Rajshahye, C. India.

The following account of the cultivation of ginger has been received from the Hill States adjoining the Ambàlah district. Ginger is principally produced in Mahúr Mássá, Patrá, Dárrá, Kothi, Kotahi, Bágal, and Jayál. The best pieces of last year's harvest are selected and placed in the corner of a house in the month Phágan; the heap is then smeared over and covered with cowdung to keep the roots from drying up in Hár month; when the first rain falls, they plough up the land two or three times; they divide the land off into beds with a little raised edge round each bed, taking care to make openings to let superfluous water run off, for if water stands on the crop, the roots will rot. They then bury little pieces of the roots three inches deep in the soil at intervals of nine inches; they next cover over the field with the leaves of trees, which keeps the soil moist, and over the leaves they spread manure, to a depth of half an inch; when it rains the water impregnated with manure filters readily through the leaves to the roots. Artificial irrigation is not employed while the rain lasts, but from Assuh to Poh it is necessary. In the month Poh the plants are about two feet high; for every one shoot there are eight tubers or parts of the root; these are dug out and buried in another place for a month; then they are taken out, exposed to the sun for a day; and are then fit for use.

In the months of Sawán, Bhadon, and Assúh, three times, the field is weeded. A begah of land requires 8 maunds of ginger to plant it, and yields 32 maunds for a first-rate crop.

Ginger fit for planting again sells at eight to ten seers per rupee; that for use only, at 24 to 32 seers per rupee.

In order to dry ginger into "sonth," the fresh roots are put into a basket, which is suspended by a rope, and then two men, one on each side, pull it to and fro between them by a bit of rope attached, and thus shake the roots in the basket; this process is carried on for two hours every day for three days. After this, the roots are dried in the sun for eight days, and again shaken in the basket. The object of the shaking together is to take off the outer scales and skin of the roots. A two days' further drying completes the process, and sonth sells three seers to four seers per rupee.

Turmeric is cultivated in the same manner; when ready it is dug up, steeped in hot water a day and a night, and then dried.

Capsicums, Shahabad. Chillies, Nepal. Chillies, Vizagapatam, Chittagong. Cayenne, Madras.

A large number of species, probably chiefly Capsicum fastigiatum and Capsicum frutescens, appear under the name of Chillies or Red Pepper. The dried ripe fruit is the part used, and some one or more of the numerous species of Capsicum yielding them are cultivated all over India. When powdered, they constitute chilly powder, or cayenne pepper.

Curry Powder. Madras. Turmeric, five samples (Curcuma longa). Berar, Bimlipatam, Nagode, Dehra Doon.

In the dried rhizome of a similar plant to ginger, which likewise is widely cultivated. The bright yellow powder of these rhizomes forms one of the chief ingredients of the renowned "curry powder," which has such an important place in Indian cookery.

Wild Nutmegs and Mace, two samples. Bombay. Mace, Malacca. Tej Pat leaves, Madras. Cinnamon, Malacca. Kali Jeera, Faridpur. Adjwan, four samples (Ptychotis ajowan). Berar, Oudh, Faridpur, Vizagapatam.

These little aromatic seeds are employed by the natives for medicinal and culinary purposes. They may be purchased in any bazaar in India, and are one of the most common of carminative seeds.

Coriander, three samples (Coriandrum sativum). Berar, Oudh, Faridpur.

The Coriander plant is cultivated extensively in India for the sake of its seeds, which enter into the composition of curry powder, and are employed in other ways as a spice or condiment, and as a medicine. The green plant is also used as a vegetable, and is exposed for sale in the bazaars during most of the year.

Dill Seed, two samples (Anethum sowa). Faridpur, Dharwar. Fennel Seed, two samples (Fœniculum panmorium). Oudh, Sind.

The fennel seed found in the Indian bazaars is the produce of this species, which is regarded by some as only a variety of Fœniculum vulgare. Its uses and properties are similar to those of the other umbelliferous seeds, such as Caraway, etc.

Fœnugrec, four samples (Trigonella fœnumgrecum). Vizagapatam, Faridpur, Sind, Kattywar. Water-lily stems (Nelumbium speciosum). Sind.

OIL SEEDS.

Linseed. Linum usitatissimum. Ten samples from Faridpur, Ahmednuggur, Khandeish, Nagpore, Berar, Central Provinces, Rajshahye, Bengal, and Indore.

Large quantities of linseed are imported into Britain from India. The oil is obtained either by simple expression without the aid of heat, when it is of a pale yellow color, or by the application of a temperature of not less than 200° Fahr. In the latter case it is of a deep yellow or brownish color and disagreeable odor. The oil prepared in India is inferior to that of Europe, from the fact that the Indian seeds being mixed with those of mustard, with which they are grown, the drying properties of the oil are impaired. Linseed contains one-fifth of its weight of mucilage (entirely resident in the testa), and one-sixth of its weight of fixed oil.

Teel Seed. Sesamum Indicum. Ten samples from Bombay, Bengal, Vizagapatam, Dharwar, Berar, Central Provinces, Bombay, Ahmedabad, and Madras.

Three varieties of Sesame Seed are cultivated in India—the white-seeded (Suffed-til), the red or particolored (Kala-til), and the black variety (Tillee); it is the latter which affords the greater proportion of the Gingelly oil of commerce. At the commencement of 1861, white seed was worth in the London markets 65s; black and brown, 58s. and 60s. per quarter.

A second sort of sesame oil, sometimes called "rape," is obtained from the red-seeded variety.

Black Sesame is sown in March, and ripens in May. Red sesame is not sown till June.

Sesamum seed has of late been exported largely to France, where it is said to be employed for mixing with olive oil.

Curdy seed. Carthamus tinctorius. Four samples from Dharwar, Central Provinces, Ahmednuggur, and Faridpur.

These seeds yield by expression an oil which, when properly prepared and refined, is transparent, and of a light yellow color. It is used in India for culinary and other purposes. This oil deserves more attention than it has hitherto received in this country; and if once fairly introduced, there is no doubt whatever of its becoming a staple import. It is used in some of the government workshops as a "drying oil." It is believed to constitute the bulk of the celebrated "Macassar Oil." The seed is exported under the name of Curdee or Safflower Seed. In Oude it is sown in October, either alone or along the edge of wheat crops; both light and heavy soils are adapted to it. It is cultivated in every village, but not extensively. There would be no difficulty in farther cultivating it to any extent. The cost of the seed, which is called "Barré," is 18¾ seers per rupee, and the cost of the oil is from 3 to 4 seers per rupee.

Sunflower seed, Helianthus annuus, Khandeish. Niger seed, Guizotia oleifera. Five samples from Dharwar, Ahmednuggur, Bengal, Kolapore, and Tanna.

These seeds of a composite plant are much esteemed as an oil seed, and, as such, enter into European commerce. The plant is commonly cultivated in Mysore and the Deccan. The oil is sweet-tasted, and is used for the same purposes as Gingelly oil.

Poppy seed, Papaver somniferum. Five samples from Central Provinces, Bengal, Central India, Oude.

The seeds yield by expression about 50 per cent. of a bland and very valuable oil, of a pale golden color, fluid to within 10° of the freezing-point of water. It dries easily, is inodorous, of agreeable flavor, and partly soluble in alcohol. The seed is worth about 61s. in the English market. By simple exposure to the rays of the sun in shallow vessels the oil is rendered perfectly colorless. It is expressed by means of a heavy circular stone, placed on its edge, made to revolve by a long lever, and the apparatus is worked by draught bullocks.

The seed has no narcotic qualities, but has a sweet taste, and is used, parched, by the lower class of natives as a food; it is also much used by the sweetmeat makers as an addition in their wares.

Mustard, Sinapis glauca, Maunbhoom. Mustard, Sinapis dichotoma, Calcutta. Mustard, Sinapis dichotoma, Punjab. Mustard, Sinapis sp., Central India. Mustard, Sinapis ramosa, Dharwar. Mustard, Sinapis sp., Dacca. Mustard, Sinapis dichotoma, Howra. Mustard, Sinapis glauca, Shahabad. Mustard, Sinapis glauca, Sarun. Mustard, Sinapis glauca. Central India.

Several species or at least distinct varieties of Sinapis are cultivated throughout India for the sake of their oil, which is much esteemed for cookery, for medicine, and for anointing the person.

Groundnuts, Arachis hypogœa. Five samples from Ahmednuggur, Khandeish, Berar, and Indore.

The groundnut is extensively cultivated in various parts of India; the kernels yield about 44 per cent. of a clear, pale yellow oil, which is largely used as food, and as fuel for lamps. The value of groundnut kernels in London is about £16 10s. per ton, and of the oil £42 to £43 per ton. For ordinary purposes it is quite equal to olive oil.

Castor-oil seed, Ricinus communis minor. Five samples from Baroda, Bombay, Dharwar, and Bimlipatam. Castor-oil seed, Ricinus communis major. Five samples from Bombay, Central India, Central Provinces, Baroda, and Khandeish.

The castor-oil plant is extensively cultivated all over India. It is sown in June by almost all the villages, not extensively, but principally for their own use. Its cultivation can be extended all over Oude. The oil is extracted by bruising the seed and then boiling it in water; the oil is afterwards skimmed off. This is the only seed out of which the oil is extracted by boiling, as in this case it is found cheaper than the method used for other seeds, which is by pressure.

The cost of the seed is one rupee per maund, and the price of the oil is from two to five seers per rupee, according to the abundance of the crop in the season. The proportion of the oil yielded is about half the weight of the seeds boiled; it is only used for burning.

In Cuttack, the plant is grown all over the province, a good deal in patches of newly-cleared land in the jungles of the tributary states and Sumbulpore. The oil is extracted in two ways. It is used for burning and culinary purposes, and medicinally also The local market is now 11½ peculs of the seeds per rupee. Both the native methods of extracting oil are wasteful and tedious, and therefore expensive. European oil presses, and a knowledge of some methods of clarifying the expressed oil, seem only to be required to render the oil-seed crops of this extensive division of great value.

The large seeds, Ricinus communis major, are employed for lamp oil, and the small seeds, of the variety Ricinus communis minor, yield the medicinal castor oil.

Physic Nut, Jatropha curcas, Khandeish.

These euphorbiaceous seeds yield a valuable oil, which has for some time been known to a limited extent in the English market.

Croton seed, Croton tiglium. Hone seed, Calophyllum inophyllum, Madras. Churonjee, Buchanania latifolia, Bengal. Mowah seeds, Bassia latifolia, Central Provinces. Poonja, Pongamia glabra. Cress seed, Lepidium sativum, Aden. Radish seed, Raphanus sativus, Sindh. Black Cumin, Nigella sativa, Bengal. Black Cumin, Nigella sativa, Aden. Amadee, Hibiscus cannabinus, Khandeish. Cotton seed, Gossypium herbaceum, Berar. Moringhy, Moringa pterygosperma, N. India. Kamala seed, Mallotus Philippinensis.

ISINGLASS, ETC.

Edible birds' nests, Junk, Ceylon.

These are collected from the rock caves along parts of the Burmese coast, the Andaman and Nicobar Islands, for exportation to China, where they are considered a great luxury as an article of food. The nest is composed of inspissated mucus from the large salivary glands with which these birds are provided.

Fishmaws, Bombay.

Fishmaws are the swimming-bladders or sounds extracted from the fish and dried in the sun. They are numerously prepared on the Malabar coast, and exported to Bombay, from whence large quantities are re-exported, principally to China and the Straits Settlements.

Shark's fin, Bombay.

Sharks' fins are largely exported from Bombay and Madras to China, where they are much esteemed, being used for the making of soups. From 7000 to 10,000 cwts. are annually exported there from Bombay.

Glue, Cawnpore.

WAX.

Beeswax, Travancore. Beeswax, Pegu. Beeswax, Rangoon. Beeswax, Singapore (*via* Calcutta). Beeswax (black), Chota Nagpore.

There are several kinds of honey-bees common in India. One species (Apis sp.) is kept in a semi-domestic state by the natives along the N. W. Himalayas, and in Kumaon, Kashmir, etc., the bees being hived in the walls of the houses. The hive consists of an earthen pot or other receptacle contained in a small chamber in the wall, and having but a small external opening for the entrance and exit of the bees, but closed internally by a cover, through which the honey is removed after the bees are stupefied by smoke.

The large wild bee (Apis dorsata) constructs its nest on the boughs of trees, making a comb about half the size of an ordinary cart-wheel. It is common throughout India.

II. MATERIA MEDICA.

A very complete collection, representing the materia medica of India, as follows:

Mossed Bark, Cinchona succiruba, Neilgherries. Cinchona Bark, Cinchona succirubra, Neilgherries. Cinchona Bark, Cinchona succirubra, Kangra. Calisaya Bark, Cinchona calisaya. Neem Bark, Azadirachta Indica. Conessi Bark, Holarrhena antidysenterica. Satween Bark, Alstonia scholaris, Bombay. Nux Vomica Bark, Strychnos nux vomica. Pomegranate Bark, Punica granatum. Chiretta, Ophelio chirayta. Indian Sarsaparilla, Hemidesmus indicus. Guluncha, Tinospora cordifolia. Pareira Brava, Cissampelos pareira. Columba Root, Jateorhiza columba. Asgund, Physalis somnifera. Licorice, Glycyrrhiza glabra, Bombay. Pellitory, Anacyclus pyrethum. Jatamansi, Nardostachys jatamansi, Madras. Mishmee teeta, Coptis teeta, Assam. Bish, Aconitum ferox, Himalayas. Aconite, Aconitum napellus. Bish, Aconitum ferox, Nepal. Atees, Aconitum heterophyllum. Black Mooslie, Kala Mooslie, source unknown. Mooslie Seeah, Murdannia scapiflora. Galanga, Alpina galanga. Indian Pennywort, Hydrocotyle Asiatica. Tinnevelly Senna, Cassia lanceolata. Senna, Cassia acutifolia, Bombay. Patchouli, Pogostemon patchouli. Croton Seed, Croton tiglium. Chaul Moogra, Hydnocarpus odoratus. Gaub Fruit, Embryopterus glutinifera. Nux Vomica, Strychnos nux vomica, Madras. Poppy Heads, Papaver somniferum, Behar.

The seeds yield by expression about 50 per cent. of a bland and very valuable oil, of a pale golden color, fluid to within 10° of the freezing-point of water. It dries easily, is inodorous, of agreeable flavor, and partially soluble in alcohol. The seed is worth about 61s. in the English market. By simple exposure to the rays of the sun in shallow vessels the oil is rendered perfectly colorless. It is expressed by means of a heavy circular stone, placed on its edge, made to revolve by a long lever, and the apparatus is worked by draught bullocks.

The seed has no narcotic qualities, but has a sweet taste, and is used, parched, by the lower class of natives as a food; it is also much used by the sweetmeat-makers as an addition in their wares.

Muenphue, Randia dumetorum. Colocynth, Citrullus colocynthis. Cassia Fistula, Cathartocarpus fistula. Tamarinds, Tamarindus Indica. Star Anise, Ilicium anisatum, Bengal. Betel Nuts, Areca catechu. Sliced Betel Nuts, Areca catechu, Mysore.

The nuts of the Areca palm form the principal ingredient in the famous Oriental masticatory. These are gathered between August and November, removed from the husks in which they grow, and are then boiled till soft, are taken out, sliced, and dried in the sun.

Kamala, Mallotus Philippinensis. Oak Galls of Quercus infectoria. Agar Agar, Eucheuma spinosum, Malacca. Ceylon Moss, Gracilaria lichenoides, S. India. Mysore Gamboge, Garcinia pictoria, Mysore. Pipe Gamboge, Garcinia morella. Ammoniacum, Dorema ammoniacum. Cocum Butter, Garcinia purpurea. Rusot, Berberis Asiatica, Nepal. Aloes, Aloe vulgaris, Bombay. Henbane, Hyoscyamus niger. Untamool, Tylophora asthmatica. Bhang and Gunjah, Cannabis sativa.

The dried leaves of the hemp plant are called "Bhang," and the flower-tops with their resin, "Gunjah." The dried leaves are sometimes smoked alone or mixed with tobacco, but the more common form of taking bhang is to make it up with flour into a cake or a sweetmeat, called "Majun." Eating this sweetmeat produces great excitement and mania in persons unaccustomed to their use.

Cashmere Saffron, Crocus sativus, Cashmere. Mowha Flowers, Bassia latifolia, Madras. Cloves, Caryophyllus aromaticus, Penang. Bael, Ægle marmelos, Bombay. Lemon Rind, Citros limonum. Singhara, Trapa bispinosa, Bengal. Coriander, Coriandrum sativum. Ajowan, Anethum sowa. Bishop's Weed, Anethum sowa. Caraways, Carum carui. Henbane Seed, Hyoscyamus niger, North India. Ispaghul, Plantago ispaghula. Dhatoora, Datura alba, Bengal. Gockroo, Tribulus lanuginosus, Bombay. Cardamoms, Elettaria cardamomum, Mysore. Cardamoms, Cardamomum medium, Calcutta.

The officinal, or Malabar cardamoms, are well known in Europe for their medicinal uses, but in India they are equally appreciated and used as a spice or flavoring ingredient, entering into the composition of many native dishes. The plant is a native of the Western Coast, and is cultivated in Malabar. In the Travancore forests it is found at elevations of 3000 to 5000 feet. The mode employed for obtaining cardamoms is to clear the forests of trees, when the plants spontaneously grow up in the cleared ground.

Black Pepper, Piper nigrum, Travancore. Cubebs, Piper cubeba. Cocculus Indicus, Anamirta cocculus. Juniper Berries, Juniperus communis, Himalayas. Neil Kalmee, Pharbitis nil.

OPIUM.

The cultivation of the poppy in India can be traced back to the sixteenth century. An allusion is made to the opium and saltpetre monopolies of the Emperor Akber in the reign of Queen Elizabeth, in the celebrated Ayeen Akber of Abul Fuzul, prepared during the latter part of the sixteenth century.

The poppy plant has been cultivated in Nepaul for years, doubtless for as long or longer than in Bengal and the Northwestern Provinces; and it may be that the opium from India was first introduced into China by the Nepaulese, and afterwards by the Dutch, who used to purchase the drug for export, long before the East India Company held possessions in India.

The process of the manufacture in India at the present day is as follows:

About the end of January the poppy plant commences to flower, and continues till March; the petals are watched, and are carefully collected in the following manner:

The forefinger and thumb encircle the stem just beneath the pod, and with the other fingers drawn inwards a kind of tube is formed; this tube is then gently raised straight over the pod, and if the petals are matured, they come off. They are never plucked off, as it would injure the pod. When a sufficient quantity has been collected in this manner, the cultivator proceeds to manufacture them into flat cakes something like pancakes, or, as they are technically termed, flower leaves, and the opium cakes are wrapped in these leaves.

The manufacture of the flower leaf is simple and inexpensive. A circular-ridged earthen plate, about twelve inches in diameter, is placed over a slow fire, the required quantity of petals is then placed in it, and pressed with a damp cloth pad till they have adhered together; the flower leaf is then removed and allowed to dry, when it is ready for use in the manufacture of opium.

In February the poppy plant is pretty well advanced, and the prospects of the season can then be fairly ascertained.

In some instances in January, but generally in February and March, the pods mature, and are lanced in the afternoon; the opium is allowed to exude and remain on the pod till the next morning, when it is scraped off gently with a small iron scraper, and the thumb or finger is then run over the incisions to close them. The number of incisions required to complete exudation of all the juice varies, and ranges from one to five and six, and occasionally to seven and eight in some isolated cases. The opium thus collected is placed in earthen or brass vessels slightly tilted, to drain off the dew and any opium-juice it may contain; and when the whole of the drug is collected and thus treated, it is carefully manipulated, put into a new earthen pot, and set aside in some ventilated and safe place. Should the opium be of low spissitude, it is exposed in some shady place (not in the sun), turned over occasionally and very carefully, so as not to injure the grain, and is so treated till it reaches the required consistency, and remains in the custody of the cultivators until it is weighed.

After the opium has been extracted, the pods are allowed to dry, and are then broken off, and the seed collected. An ample quantity is kept by the cultivator for next season's sowings, and the remainder disposed of to traders.

The leaves of the plant are left on the podless stalks, and when withered are collected and delivered into the government opium factory, and termed technically *trash*, for packing the opium balls in the chests, for which payment is made at the rate of annas 12 a maund.

The flower leaves are weighed in March and April, and are sorted into classes. The first is of fine texture and color, and from eight to ten inches in diameter; the second slightly inferior in both texture and color, and the third is of a roughish and thicker quality; as sorted they are weighed, and the weight of each quality is entered in the leaf weighment book, when the value of each quality is calculated at the rate of Rs. 10, Rs. 7, and Rs. 5 a maund.

The flower leaves are dispatched by country boats or carts to the factory at Ghazeepore, and on arrival are weighed, examined, and classified.

Before the opium weighments commence, the several books are prepared; new earthen jars and pots, with covers, are purchased and carefully weighed; coarse cloth, sealing-wax, and twine for closing and sealing the jars, and baskets for holding the filled jars, are also purchased; every scale, beam, weight, pan, and reservoir is carefully examined and tested, and then the weighments take place.

After the opium has been brought in by the cultivators, it is tested, and samples of each consignment are taken for a careful analysis to the opium examiner's room to detect adulteration. The opium is then stored in large wooden vats.

The pure opium, which is fit for the China provision, and the consumption of the local market, is stored in large wooden vats, each holding about 50 maunds (about 1½ tons weight); the opium derived both from the assameewar and chullan sources is not stored anyhow, but each parcel according to its class is emptied into a vat bearing the designation of that class; the light divisions are arranged in lines.

As much opium as can be removed from the vessels by light scraping is taken, that which adheres is afterwards removed by a second scraping, and set aside for lewah, and that which persistently adheres is removed by water; this is called washings, and when evaporated is used in making lewah; the washings alone are valued at about Rs. 65,000 a season at the Ghazeepore factory, and the opium thus recovered amounts to over one ton in weight.

When a vat is filled, the opium in it is stirred by long wooden poles daily until the drug is used for caking.

When there are about 2000 maunds (about 75 tons) stored—we have accommodation for upwards of 6000 maunds—we can, if we possess the proper quantities of the various consistencies, commence caking. One may ask, but why have you not caked before you collected so much? The reply is, we are bound by order to cake at a consistence of 70°; that is, when the opium contains 70 per cent. of the pure dry drug and 30 per cent. water. We are allowed—as it is very difficult to hit off the consistence of 70° exactly when manipulating such a large quantity (nearly 3 tons) as we require daily for caking—to cake when the assay shows the opium to be above 69.50° and under 70.50°, so that we are allowed half a grain above and below the standard of 70°.

To prepare the opium for caking, a certain number of vats are marked of each class; a long iron instrument, something like a cheese-taster, is thrust from the top to the bottom of the vat (it forms half a hollow cylinder when open, and a complete cylinder when shut), and closed; the sample of opium is withdrawn, the contents of the sample drawn are thoroughly mixed up, and three specimens of 100 grains are assayed; the mean of the three results is taken as the correct consistence. By the same process the samples from all the vats, which have been marked, are taken and assayed; those which will give, when mixed together in certain proportions (by rule of alligation), opium at a consistence of 69.30° or 69.40° are exported to the alligation vats, and the contents of the selected vats are equally distributed over the seven alligation vats, so that the consistence of each may be uniform; the opium is then well mixed by rakes and by men walking about in it, and kneading it with their feet. At about 3 P.M. it is removed from these vats into the five caking vats; equal quantities being taken from each of seven alligation vats are distributed over the five caking vats. On the following morning the opium in each vat is again mixed by six men allotted to each from 5 A.M. to 8 A.M. Four samples are drawn from each vat, and thoroughly incorporated together, and three specimens from this mass are taken for assay; this pertains to every caking vat. Should the whole of the assays of each caking vat come out above 69.50 and under 70.50, the agent of the Ghazeepore factory gives the order to cake, or in his absence the principal assistant does so.

The cultivation of the poppy plant is rendered as far as possible both profitable and popular.

A large room, 944 feet long by 27 feet wide, accommodates the 250 cakemakers; each cakemaker has a number and a place assigned for him to work at, the cakemaker's number being printed on the wall above his seat. Each man is provided with a wooden seat, and is furnished with a brass cake mould, forming the half of a hollow sphere; he has also a tin vessel graduated so as to hold 4½ chittacks of lewah, the regulated quantity which is used in making the shell of each cake.

The opium produce per beegah ranges from one to fifteen seers, according to the quality of the soil, and the attention and care bestowed on the cultivation, and state of the weather. The profit varies, and ranges from Rs. 1 to Rs. 50 or upwards per beegah.

The following materials are used in making a cake, and as it is necessary that every cake should be of the same weight, viz., two seers, every precaution is taken to insure the accurate determination by weight or measure (calculated for weight from actual experiments) of the articles which compose the cake. The proportion of each article is given in the table below:

	Seers.	Chittacks.
Standard opium at 70,	1	7.5
Lewah at 53,	—	4.5
Flower leaves,	—	5.0
Water,	—	.5
Trash,	—	.25
Total weight of cake on the day of manufacture,	2	1.75

The lewah now demands attention. Lewah is a paste made by breaking down opium in water which has been used for removing the traces of opium which adhere to the jars and vessels in which opium has been placed; this is called washings or technically *dhoe;* the washings contain about 8 to 10 per cent. of opium; the opium is broken down in large vats containing about 800 cubic feet, and about 8 per cent. of pussewah is added to the lewah to render it smooth and glutinous.

When the lewah has a consistence of over 52.50 and under 53.50, it is called standard lewah; its consistence is determined every morning by assay, and until it is of the proper degree, caking cannot commence.

The lewah is delivered in bulk by weight, and the quantity to be used for each cake is measured by a brass cup which delivers 4½ chittacks at 53°.

The poppy flower leaves agglutinated by the lewah form the shell of the cake; 5 chittacks of dry leaves are required for each cake; but as the leaves vary in weight according to the amount of moisture in the atmosphere, 10 seers are steam-dried daily to ascertain how much moisture they contain; knowing this, an exact increase or decrease in the weight of leaves can be made, which is required to compensate for the moisture contained. This control is necessary, since if 5 chittacks of leaves are used, which contained much moisture, when the leaves parted with that moisture by evaporation in the dry months, the cakes would be light.

The loss in weight which the leaves sustain by steam-dryings is determined on the day previous to their being required for use; the bulk required for the caking of the next day is weighed out and damped in the afternoon, so as to render the leaves supple and pliant; when dry they are crisp and break readily.

Having explained the preliminaries of caking, the method will now be described. Down the centre of the room the scales for weighing opium and the lewah vats are placed; there is a weighman for each scale and two assistants; the weighman weighs the opium on a very delicate scale, and one assistant searches the opium to ascertain finally that there are no extraneous matters in it; the second man arranges the movable tin pan, and places the opium on it.

When caking commences the caking vat room doors are opened, and the opium is brought out in tinned sheet-iron vessels holding 20 lbs. each. One vessel is set before every scale, and a sufficient quantity for one cake having been searched is handed over to the weighman's second assistant, who adjusts the quantity in the pan. When the weighman declares it to be correct the tin plate with the opium is taken away by a boy to his cakemaker, who has been supplied in the meantime with a tincup filled with the requisite amount* of lewah for a single cake; he has also received the proper quantity† of leaves for one cake. Having these by his side, he now rapidly forms in the brass mould the lower half of the shell of a cake, pasting by means of the lewah, leaf over leaf, until the thickness of about seven-sixteenths of an inch has been obtained. He allows in so doing the upper part of some of the leaves, which he tears in half and places vertically, to hang down outside the mould (with these he forms the upper half of the cake). The cake shell is principally made of half leaves vertically placed, other halves being inserted horizontally so as to give equal strength in all directions. Having finished the lower half of the shell he takes the tin plate and accurately, to a grain, removes the opium into the half of the shell now ready for its reception; it is pressed upwards into the shape of a cone, some pieces of leaves are applied horizontally to it, then some lewah, now some of the parts of the leaves hanging down are pulled up and secured, more pieces are applied horizontally, and at last, having pulled up and properly arranged all the pieces of the leaves which were hanging around the cup, a whole leaf is applied to the top, and the cake is now finished.

It is a sphere of about the same size as a 24-lb. spherical shot; it is removed from the mould and dusted with a little coarsely powdered poppy trash, so as to prevent its adhesion to the cup, made of burnt unglazed pottery, which is of the same shape as the mould in which the cake was made. It is now carefully placed in the cup while still soft, and it is carried out by the cakemaker's boy, who puts it in the sunshine on a little square of brick flooring, which has been allotted to the cakemaker whom he serves, and where a small board stands bearing his master's number.

Before removal a paper ticket is pasted on the cake, bearing the cakemaker's number and the date on which it was made; every cake has its ticket, so that we can at any time trace its history, and by this means we can hold every cakemaker responsible for the careful manufacture of his cakes; by means of these tickets, should anything be found wrong with any cake, it can be brought home to the man who made it.

The caking begins generally at 10 A.M., and lasts till half-past one or two o'clock in the afternoon; usually 20,000 cakes are made daily.

The cakes are, on the evening of the second day, counted and sent to their destination in one of the cake godowns, where they and their cups are stored in rakes.

The great object to be attained is to make the cake as carefully and compactly as possible by one operation, to have the shell even in thickness throughout, and to spread the lewah uniformly between the leaves. This can

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[*] 5 chittacks.

[†] 2 chittacks.

be attained by good cakemakers under strict supervision; cakemakers usually make 60 cakes a day; every good cakemaker gets 20 or more additional ones to make, for which they receive an extra allowance.

The flower-leaf forms an excellent covering; it is in every way suitable, but it has its drawbacks. It is affected by wet, and is liable to be attacked by mildew, borers, and white ants, while it will not resist hard pressure applied to any small area of its circumference; however, it certainly most effectually retains the moisture and aroma of the drug enveloped in it, and by its own fragrance adds to that which the opium *per se* contains.

The cake godowns are large and high brickwork buildings, with galvanized iron roofing, well ventilated by numerous windows and doorways. The windows have iron gratings fixed in the masonry outside, and skeleton doors are provided for the best godowns to admit of the entrance being closed, while free perflation of air is not interfered with. All the doors and windows of the better class godowns are further secured from thieves by galvanized-wire netting, so that cakes cannot be cut up and passed out in large pieces.

Inside the godowns are wooden racks, extending nearly up to the roof; there are intervening rectangularly-placed passages traversing the frames to permit of ventilation. In these racks the cakes are stored in their cups.

Every third day the cakes, wherever placed, come down to the ground, are lightly hand-rubbed with a little trash, turned, replaced in their cups, and sent up again to be placed in the racks. The object of turning is to allow the shell of the cake to dry evenly.

The packing takes place only in dry weather, and after the morning dew has been dispersed.

Into a strong mango-wood chest, one yard long and two feet four inches wide, 40 cakes are packed in two layers of 20 each; the balls are prevented from rolling about by each one being placed in a compartment; and in these chests, varying in number according to the year, the opium cakes find their way to Calcutta, whence they are shipped to China at the close of the annual government sales, each chest realizing as much as £30, or, in other words, 1000 rupees, in an average good season. (*R. Saunders, Collector of Ghazeepore*, 1873.)

Opium, Papaver somniferum, Behar. Opium, Ball as prepared for the Chinese market, called "Provision Opium." Blistering Beetles (Mylabris sp.), Madras; used as a substitute for European cantharides in Indian Hospitals.

Jamaica Drugs, Robert Thomson, Superintendent of Botanical Gardens, Kingston, Jamaica.

Cocoanut Oil (Cocos nucifera). Obtained by pressure. This system of preparation is a desideratum in the island.

Cocoanut Oil. Obtained by boiling. This process of preparation is general throughout the island. This edible oil is extensively used by the peasantry. It is also used for burning. Producible in this island to a large extent.

Cashew Nut (Anacardium occidentale). This oil is said to be superior as an edible oil to the olive or almond. The kernels have been introduced in English commerce under the name of Cassia Seeds. The roasted nuts are an excellent dessert fruit.

Cashew Nut. Oil from pericarp of the nut is also obtained.

Oil of Ben (Moringa pterygosperma). Used by watchmakers and perfumers. It does not turn rancid. Grows in waste places, produces seed in one year, and requires little cultivation. Eugene Rimmel says of this oil: "It produces an extremely fine, clear, sweet, and fluid oil, qualities very valuable in perfumery." The winged seeds yielded 65.6 per cent. of kernels, and these kernels yielded 30 per cent. of oil by expression, or 19.7 per cent. of oil from the whole seed.

Gingelly or Wangle (Sesamum Indicum). This tasteless oil is quite equal to olive oil, with which it is said to be commonly mixed in France. It keeps for years without becoming rancid. The plant is an annual, and grows in dry places. The seeds have medicinal properties assigned them. In India it is used more extensively by the natives than cocoanut oil; and both seeds and oil form an article of extensive export. It is also used for perfumery. In Egypt and China it is largely produced. There are only a few acres of the plant in cultivation in Jamaica. The seeds expressed, as bought in the market without any preliminary cleansing, yielded 40 per cent. of oil.

Ground Nut or Pindar (Arachis hypogœa). This is a well-known and valuable commercial oil, which, however, is not made in Jamaica, there being only a few acres in cultivation. "This oil is used as a substitute for that of olives, to which it is equal in quality." It does not soon become rancid. Like the preceding, this plant, which is an annual, might be largely cultivated in Jamaica with great advantage. Ground Nut gave 43.75 per cent. of kernels, and the kernels gave 40 per cent. of oil by expression, or 17.5 per cent. of the whole nut.

Santa Maria Nuts (Calophyllum calaba). Oil fitted for burning in lamps. Santa Maria Nuts yielded 65.5 per cent. of kernels, which yielded more than 50 per cent. of oil by expression.

1. The dark sample expressed from the kernels as removed from the shells.

2. The lighter expressed from the residual cakes of No. 1 after grinding and drying them for two days in the air.

Sand Box (Hura crepitans). Twenty drops of this oil used as a purgative is equal to a tablespoonful of castor oil, and less nauseous. Sand Box seeds yielded on expression 25.5 per cent. of oil on the whole seed, the bulk of the shells having been removed before pressure was applied.

Antidote Cacoon (Feuillea cordifolia). Semi-solid fatty oil. Burns well in lamps, and sometimes used medicinally. Antidote Cacoon yielded 55 per cent. of kernels, which yielded at a temperature of 84° Fahr. 18 per cent. of oil by expression. From the residue 28 per cent. of a solid fat was obtained by means of bisulphide of carbon, or a total of 46 per cent. of fatty matter from the kernels, or 25 per cent. on the whole seed.

Candleberry Tree or Cobnut (Aleurites triloba). This is known here as

Country Walnut. In Ceylon it is called Kekuna. It is a palatable oil, and burns in lamps. Said to be a good substitute for linseed oil. The Cobnut yielded 33 per cent. of kernels, giving 57 per cent. of oil by expression, or 19 per cent. on the whole nut.

Candleberry Tree. Obtained by boiling.

Castor Oil (Ricinus communis). Obtained by pressure without heat. Could be largely produced with little cultivation.

Castor Oil. Obtained by boiling. This is the kind used generally in the island.

CINCHONA BARKS.

The cultivation of Cinchonas was commenced by the government in 1868, and the plantation now consists of three hundred acres, about forty acres having been planted annually. The climatal conditions requisite for this culture are found in our Blue Mountains at a height of from 4000 to 6000 feet above the sea, where the temperature rarely falls below 50° Fahr., or rises above 70°, and where the necessary humidity is afforded. The first crop of bark is expected to be realized about the tenth year from the time of planting out, as has been the case in the plantations of India.

A report on Cinchona cultivation in Jamaica will be found in the reports of the United States Department of Agriculture for 1871 by the botanist attached to the San Domingo Commission.

Yellow Bark (C. Calisaya). Bark from a tree seven years old; weight, 3 pounds. This species, grown in Jamaica, was analyzed a few years ago by Dr. De Vrij, of the Hague, and by the Messrs. Howard, of London, and yielded very satisfactory results.

Red Bark (C. succirubra). Bark obtained from a tree seven years old, and weighing 4 pounds. The tree from which this bark was stripped, measuring 22 feet in length, is exhibited with the bark. The stem will afford information as to the successful growth of the plant. This bark was also analyzed along with the preceding species, and proved very satisfactory. This plant grows with greater rapidity than the former.

Crown or Loxa bark (Cinchona officinales). Bark from a tree seven years old, and weighing 2 pounds. This species does not grow so vigorously as the two preceding, and the analysis was comparatively unfavorable, so that its cultivation has not been extended since the analysis was made.

Jalap (Exogonium purga). On the Cinchona plantations, at a height of a little over 5000 feet above the sea, a few acres of Jalap have been planted, and a crop from the same will be reaped this year. Specimens of jalap tubers grown here were analyzed a few years ago by the Society of Apothecaries of England with very favorable results, the percentage of resin in the Jamaica sample being 10.71 per cent., whereas in the best commercial Jalap imported into England the percentage of resin amounted only to 10.31 per cent.

Bitter Wood (Picrœna excelsa). Lofty tree. The "bitter cups," which impart a bitter taste to the water left in them, are obtained from this wood. About one hundred tons of this are exported yearly.

Sarsaparilla (Smilax sarsaparilla). The name "Jamaica Sarsaparilla" originated from the fact of this island having been the central mart from which the drug, imported to it from Columbia, etc., was afterwards distributed over the world. There is still much uncertainty as to the precise species which yields the genuine "Jamaica Sarsaparilla." What is grown here fetches a fair price. It is cultivated and exported to a small extent.

Senna (Cassia obovata). This plant was introduced by an African slaver about a century ago. It has only been cultivated in small patches, but recently the government have been trying its cultivation on an extended scale. Medical practitioners of note have prescribed this variety of senna in preference to any imported. A sample sent to the Society of Apothecaries in England was sufficiently encouraging to warrant its cultivation.

Gum Guaiacum (Guaiacum officinale). A decoction of this wood is in common use here for rheumatism and skin diseases. The resin of commerce is obtained by incisions in the trunk, and by heating the wood it also exudes spontaneously.

Aloes (Aloe vulgaris). This plant flourishes in sandy and arid places, and could be grown with little or no cultivation to a large extent.

Simaruba Bark (Simaruba amara). Bark of root used as a tonic in diarrhœa and dysentery, etc. Small quantities are occasionally exported.

Canella Bark (Canella alba). Used as a spice by the negroes. Aromatic stimulant and tonic.

Bastard Cabbage Bark (Andira inermis). A powerful anthelmintic and narcotic. Used in the form of a powder, decoction, or extract. An overdose produces "vomiting, delirium, and fever." Lime-juice is said to be an antidote for an overdose.

Cassia Pods (Cassia fistula). Cultivated and frequently sold in the shops. A mild laxative.

Adrue (Cyperus articulatus). A decoction of the rhizome is frequently used by the negroes as an anti-emetic. It has been used with advantage in cases of yellow fever to stop the black vomit. Its properties would appear to deserve investigation.

Mexican Thistle (Argemone Mexicana). "The seeds possess acrid, narcotic, and purgative properties." They also contain a medicinal oil.

Cow-itch (Mucuna pruriens). The well-known remedy for intestinal worms.

Bitter Bush (Eupatorium villosum). A decoction or an extract of the leaves and twigs is used here in cases of fever, and its medicinal properties have been favorably recommended.

Castor Oil. See oils.

Fruit of Baobab (Adansonia digitata). This nut possesses medical properties that are valued by the Africans. A decoction of the nut is said to be used for dysentery.

Kola Nut (Cola acuminata). This is perhaps the most prized of all the products of tropical West Africa, where it is largely used as an article of medicine, especially in diarrhœa and affections of the liver. Ten thousand donkey loads of the seeds are conveyed to the interior annually. Negroes in Jamaica commonly carry seeds with them when travelling, in order to allay hunger and to counteract the effects of bad water or derangement of the liver. The fresh nut contains a larger percentage of thein than either tea or coffee, but when dried this principle is less abundant.

Dogwood Bark (Piscidia erythrina). Used to intoxicate fish. A tincture of the bark of the root is a strong narcotic and diaphoretic.

Baobab Bark (Adansonia digitata). This is stated to have been used with great success in miasmatic fevers, and also in intermittent fevers. "It produces increased appetite and perspiration."

Pomegranate Bark (Punica granatum). A valuable anthelmintic. Used as a decoction, or in powder. It is the root-bark that is used in commerce.

Pimento, Allspice, or Jamaica Pepper (Eugenia Pimenta). Jamaica enjoys the monopoly of this product, as nearly all the article in commerce is furnished by Jamaica. It is extensively cultivated, the quantity exported averaging 50,000 cwts. This sample has been obtained from C. W. Steer, Esq., St. Ann's. The pimento tree furnishes walking-sticks and umbrella-handles that are in great request.

Ginger (Zingiber officinale). Jamaica ginger is the finest in the world, and commands by far the highest prices. The quantity exported annually averages from 5000 to 10,000 cwts. Great care is taken with the rhizomes after they are dug up, they being cleaned, scraped, and dried in the sun.

Nutmegs (Myristica moschata). This plant is only cultivated to a small extent, but there is a strong desire to extend its cultivation, as hundreds are being planted yearly. A few are exported.

Vanilla (Vanilla planifolia). Cultivated at the botanical gardens.

Betel Nut (Areca catechu) Cultivated as an ornamental tree. Highly astringent and aromatic. Extensively used in the East for its stimulating effect upon the nervous system.

Chillies, dried (Capsicum annuum). Grows with little or no care.

Cayenne Pepper. Made from the preceding.

Assam Variety of Tea (Thea assamica). Grown at the government cinchona plantations, where it thrives admirably. It could be produced to a large extent on some of the hills that are too damp for coffee.

Cocoa (Theobroma cacao). Formerly largely cultivated in the island, but now only to a small extent. The quantity exported averages 600 cwts. The cultivation of this plant in hot and humid localities deserves the utmost encouragement.

Chocolate. From cocoa grown in the island and manufactured in Kingston.

Coffee-Leaf Tea. Possesses similar properties to tea.

DYES.

Logwood (Hæmatoxylon campechianum). Notwithstanding that this is an introduced plant, it has become so completely naturalized that it occupies a much larger area of land than any other plant in the colony. The extent of land covered by this product is not less than two hundred square miles. From 60,000 to 100,000 tons are exported annually.

Fustic (Maclura tinctoria). The average export of this product is 2500 tons annually. Common in most parts of the island.

Candle Wood (Cassia emarginata). This appears to be a new dyewood. 264 tons were exported in 1874. It is a small tree and grows in dry savannahs.

Sappan Wood (Cæsalpinia Sappan). This tree has been introduced upwards of twenty years, and its cultivation is slowly spreading, but not in sufficient quantity for export.

Logwood Extract. Obtained from the Jamaica Dyewood Extract Company. This extract, as prepared by A. Lenormand, Esq., contains only the pure coloring matter of the wood. It is stated that the refuse of the wood, after it is operated upon, supplies sufficient fuel for the manufacture of the concrete. Manufactures of this character deserve encouragement in the island.

Cacoon, antidote. Extract from wood.

Prickly Yellow. Extract from seeds, etc.

Oldenlandia Umbellata? Extract from root.

Maiden Plum (Comocladia integrifolia). Extract from twigs and leaves.

Annatto (Bixa orellana). Used by silk dyers and varnish makers, and for coloring butter and cheese. In 1874, 22,338 pounds were exported.

Turmeric (Curcuma longa). The rhizome is made into powder and used for dyeing. It is also used in medicine, and in the composition of curry powder.

Divi Divi (Cæsalpinia coriaria). Produced by a small spreading tree. Cultivated to a small extent. Thrives in dry localities. Nearly sufficient is grown for our island manufacture of leather. Its cultivation for export might be carried on with great advantage.

Mangrove Leaves (Rhizophora mangle). The leaves and twigs are largely used in the Kingston tanneries for manufacturing leather. All parts of these trees are rich in tannin. The bark has been used in medicine as an astringent.

Pimento Leaves (Eugenia pimenta). A patent has been recently taken out in Jamaica for the employment of pimento leaves as a tanning material.

Catechu Extract (Acacia catechu). Prepared by boiling the heart-wood, which is cut into chips and the liquid evaporated. It is highly astringent. It is extensively exported from India for the use of tanners. The plant is naturalized in Jamaica, and is common in dry localities.

Mangrove. Extract from twigs and leaves.

Mangrove. Extract from wood.

Mangrove, white. Extract from twigs and leaves.

Crude Products from New Zealand, containing Tannin. Dr. Hector, Colonial Museum.

Tan Barks.—Wood of Fuchsia excorticata, native name Kotukutuku; percentage of tannin, 5.3.

Bark of Eugenia maire, native name Whawhako; percentage of tannin, 16.7.

Bark of Elæocarpus Hookerianus, native name Pokaho; percentage of tannin, 9.8.

Bark of Coriaria ruscifolia, native name Tutu; percentage of tannin, 16 8.

Bark of Knightia excelsa, native name Rewarewa; percentage of tannin, 2.7.

Bark of Elæocarpus dentatus, native name Kiri-Hinau; percentage of tannin, 21.8

Bark of Weinmannia racemosa, native name Tawheri; percentage of tannin, 12.7.

Bark of Myrsine urvillei, native name Mapau; percentage of tannin, 1.4.

Bark of Phyllocladus trichomanoides, native name Kiri-Toa-Toa; percentage of tannin, 23.2.

Bark of Hoheria populnea, var. angustifolia.

Hirneola auriculæ-Judæ, Ear fungus; exported largely to China by Chinese emigrants.

Leaves of Celmisia coriacea, native name Tikapu; hills of South Island.

Taranaki Committee.—Bark of the Atauhero (Rhabdothamnus solandri). Produces a red dye.

Bark of the Pukatea (Atherosperma novæ-zealandiæ). The inner bark contains a powerful anodyne.

W. S. Grayling, Taranaki.—Extract of Kamai or Towhai (Weinmannia racemosa). A forest tree, abundant in many parts of New Zealand. The bark has been successfully applied as a tanning agent. It is also used by the Maoris in producing their red and brown colors. The dye obtained from this gives a very fast class of shades upon cotton. It can be sold at the same price as gambier and catechu.

Bark of the Towhai, from which the extract is obtained.

Timber of the Towhai.

Two samples of Extract of Hinau.

The Hinau elœocarpus dentatus is a large forest tree, abundantly diffused throughout most parts of New Zealand. The bark has been successfully used in tanning operations. The natives also use it in producing the beautiful black dye for their flax work, for which purpose the bark is first bruised and boiled for a short time. When cold, the flax is put into the mixture, where it is left for two days, after which it is taken out and steeped thoroughly for two days in red swamp mud, rich in peroxide of iron, when it is removed and dried in the sun. The Hinau can be used in the manufacture of ink, by dissolving a small quantity of the extract in water, and adding a little rust of iron. As it contains neither corrosive acid nor gum, the pen is neither injured nor clogged. The extract of Hinau can also be used instead of logwood.

The extract of Towhai is much more astringent than that of Hinau, and needs only to be introduced to be accepted by tanners.

Westland Committee.—Bark of the Tawai or Red birch (Fagus menziesii), suitable for tanning purposes; also a sample of the extract fluid.

Dried Ferns. J. Henry & Co., Taranaki, New Zealand.

A very extensive collection, peculiar to this country.

Fungi. Taranaki Committee, New Zealand.

Fungus (Hirneola polytricha), used as food by the Chinese. Largely exported from the colony. Grows principally on the Tawa.

Esculent Fern Root. Will germinate if crushed and planted in rich soil in a shady place.

Bird's Nest Fungus and curious parasites.

Drugs from Cape of Good Hope, W. H. Auret, Paarl, Cape of Good Hope, exhibited fifty-seven specimens of drugs: Xum Bessie. Myrica cordifolia, giving berry-wax, fifteen pounds of wax to a small round sack of berries. (?) Vroumeenhair, Wild Rosemary. Cochineal. Bitter Bark from Kelis Country (Trans Kei), stated by Commandant Barker to be the bark of a tree abundant in the district, and to be used by the native doctors in fever cases. Gum Thorn Tree (Acacia horrida). Pomegranate fruit. Snake Whortles (Snakeroot). Thorn Apple, D. stramonium (Stink Blaaren). Muischond Blaaren (musk cat leaves). Genees Blaareen (Solanun ninieum). Tyme Buchu (Diosma alba). The rest of these drugs were so imperfectly labelled and displayed, that the reporter could not decipher them.

Bitter Barks, Sir H. Barkly, Governor of Cape Colony.

Drugs from British Guiana. William Fresson exhibited Castor Oil Seed, Wild Cucumber Seed, Potash from sour grass, Tous les mois, Tapioca, Decamballa Starch, Arrowroot, Ginger Root, Guinea Pepper, Cacao Seeds, Cayenne Pepper, Cassava Starch, Quassia Wood, Gilbacker Glue from the Siluris Parkerii, Castor Oil, Cayenne Oil, Balsam Copaiba, Vanilla, Laurel Oil, Honey, Cocoanut Oil, Cassareep, a dark-red liquid obtained from Janipha manihot.

Pressed Ferns, Mrs. Harling and H. H. Field, Sidney, New South Wales.

Turmeric Powder, Ryder Bros., Mango Island, Fiji.

Arrowroot, from New South Wales, exhibited by James Waters, Brisbane Water; W. Cole & Son, Somago, Hunter River; W. & S. Laurie, Gloucester, Port Stephens; George Payne, Grafton, Clarence River; George Champion, Ulmarra, Clarence River; Fred. Layton, Grafton, Clarence River.

Sheep's Wool Sponge, R. H. Sawyer & Co., Bahamas. Velvet Sponge, Yellow, Grass, and Reef Sponges.

Arrowroot, John S. George, Bahamas. Also, Cascarilla Bark, and Canella Bark, Cassava Starch, Beeswax, Wax made from the whortleberry.

Lime Juice, Alexander King, Jamaica.

Vegetable Sponge, William P. Saunders, Bahamas. Specimen of Mammee Sapota or Vegetable Sponge, excellent for bathing purposes.

Arrowroot, Tucher, Tho. Fowle, Bermudas.

Medicinal Herbs and Drugs, J. B. Hugh, Bermudas.

Green Arrowroots, Tous les mois roots, Joseph Wing Haywood, St. David's Island.

Arrowroot, Tous les mois, J. T. Bartram, Bermudas. This exhibitor, an old planter in Bermuda, writes as follows about Bermuda arrowroot: "Tradition tells us that Bermuda arrowroot (so called) was originally found growing wild in South America, from there it was taken to the West Indies, and so found its way to Bermuda. It is the root of Maranta arundinacea, and was called Indian arrowroot from the fact of its curing and expelling the poison that the Indians put upon their arrows. If those poisoned arrows made but a slight wound it was certain death if left to itself, but by taking the juice of this plant inwardly and applying the bruised root outwardly over the wound a certain cure resulted." This root, as a whole, contains many medicinal qualities, the juice, pulp, and farina having each peculiar properties. Sir Hans Sloane calls it Canna Indicaradice. Alba Alexipharmica from its well-known virtues in expelling poisons, particularly those of the stings and bites of insects, etc.

It is Lopez de Gormara's counter-poison, and one of the ingredients of Hernandez's Grand Elixir or Great Antidote; he says he has frequently seen this root given in malignant fevers with great success when all other things have failed. He has given it decocted, but he says that it is best in powders, in doses of from one to two drachms; and he tells us that although it is a very floury root it may be kept for seven years, and no vermin will meddle with it, when all other roots are very apt to be destroyed by worms or weevils.

No other arrowroot (except the West Indian) possesses the same medicinal qualities. They are not arrowroot at all, being made from different kinds of roots; as for instance, East Indian arrowroot is made from the roots of Curcuma angustifolia, Brazilian arrowroot is cassava (Jatropha manihot), Portland arrowroot is from the wake robin (Arum maculatum), British arrowroot is simply potato starch, and so on to the end.

Bermuda arrowroot is the most expensive crop with the exception of Tous les mois that the planter has to deal with. It is planted in May and is ripe in March and April, and this is how it gets the advantage over the West Indian arrowroot, for from February to May we have cold winds ranging from northwest to east, and oftentimes it is very cold. This is the time when we manufacture arrowroot. The whole process is done in water; it is ground or torn into a pulp, then strained through three different sieves, each one finer than the other, then left to settle in the bottom of the tubs, it is then collected into one tub, then passed through the fine sieve into clean water; when settled the brown starch is taken off of the top of the white. This brown starch holds the same relationship to white starch as bran does to flour (it is much more astringent and more efficacious in bowel complaints than the white, and is used in preference by our people, but on account of its color there is no market for it outside of Bermuda). The arrowroot is then passed through more clean water, and a fine sieve for the last time, when it is settled hard in the tub; it is taken out, placed on cloths to harden, and then broken up fine on trays and dried in the wind and sun. Four barrels of picked, peeled, and cleaned roots will yield in good seasons about one hundred pounds of good arrowroot, and will take from five to six puncheons of clean, soft or tank water, and will be about twenty-four hours in the water from the time of grinding till it is upon the cloths or drainers. As I have said the West Indian arrowroot is made from the same plant, but on account of the heat of the climate and river water it cannot, with every attention, be made equal to Bermuda, for fermentation takes place before it is taken out of the water, and thus its nature is changed as sweet wort is converted into beer or ale or dough into bread.

Tous les Mois.—About thirty-five years ago this plant was introduced into the island from the Isle of France by our then governor, and was distributed among the planters, but, on account of the great trouble and expense, very few persons plant it at this time, for each root has to be pared like a potato, and it takes two extra waters more than arrowroot in its preparation; but it is said to be more nutritious and better adapted to the wants of invalids and young children, not so astringent or as good or bowel complaints as arrowroot. It takes about the same time to grow, and the yield is the same. J. T. Bartram sends also a small specimen of *bird-lime*, made from the Oleander or Rose Bay (Nerium), which he believes himself to be the discoverer of. He says: "I bleed the tree by slashing a diagonal cut through the bark; the sap runs freely, and is caught in a pot until about a gill is collected; it resembles cream in looks and consistency; it is highly poisonous if taken into the stomach. At this stage it is soluble in water, but in a few days about half of it is hard enough to be handled in water, which is well washed until the soluble part is washed away. It is now a firm, tough, stringy, or fibrous-looking mass, having a strong resemblance to gutta-percha, with this difference, that it is wholly soluble in oil, and when tempered with oil it is at once converted into a good strong bird-lime, which will keep good for at least two years, and if it hardens at all a little oil worked in will make it all right again."

Singhalese Spices, Seeds, Tapioca, Armitage Brothers, Ceylon. Dye, Woods, etc.

Raw Products from Singapore, Behn Meyer & Co., Singapore, Straits Settlement. Nutmegs. Cloves. Limed Nutmegs. Borneo Sago Flour. Nutmeg Fruit, Leaves, etc. Nutmegs in shell. Mace. Gum Copal. Tapioca Flour. Flake Tapioca. Cubebs. Gamboge Pipe Cube Gambier. Pearl Tapioca. Stick Lac. Sandal-wood. Gum Dammar.

Queensland Drugs, W. R. Alexander, Brisbane, Queensland. Alstonia cortex. Bark of Alstonia constricta, containing an alkaloid very like Quinia; one pint of the tincture also. Eucalypti Gum, natural exudation of Eucalyptus. Siderophloid. Iron Bark. Oleum Halicore. Oil of the Dugong. Halicore Australis, a nutrient oil used in phthisical cases, white, semi-solid. Tincture Petalestigmia Quadroculare. Castor Oil Seeds.

Queensland Drugs, S. Carmichael, Brisbane, Queensland. Eucalypti Gum. Iron Bark. Gum, foliated. Eucalypti Gum. Purified Iron Bark Gum.

Series of twenty-seven glass-topped boxes of Queensland gums. Eucalypti Gum, purified. Eucalypti Gum, foliated. Spotted Gum. Blood-wood.

Mulga. Iron Bark, two specimens. Spotted Gum (E. maculata). Gum of Xanthorrhœa arborea. Moreton Bay Ash Gum. Moreton Bay Ash Gum, stunted. Bauhinia Gum. Gydia Gum, four specimens. Infusorial Earth. Oil of Lemon (colorless). Eucalyptus Extract. Cayenne Pepper. Kino. Blood-wood, grains. Eucalyptus Corymbosa. Tincture of Eucalypti, an astringent used in the same manner as Tincture Catechu.

Dugong Oil is largely exhibited, and seems to be a prominent article in the materia medica of Queensland.

Mauritius Plants, S. Boulton, Esq., Mauritius. Forty-six specimens of medicinal plants. Acacia concinna, fruit. Ar emone Mexicana, seed-vessel like stramonium. Cinnamum Zeylanicum, leaves. Cissampilos Mauritiana. Embelia micrantha, bark and wood. Erythrium Indica, leaves. Ricinus communis, leaves. Hydroctyle Asiatica, leaves. Jatropha curcas, leaves. Siegesbeckia Orientalis, leaves. Clematis Mauritiana, leaves. Citrus bigaradia, leaves. Kirgamellia elegans, bark. Asparagus officinalis, root. Adiantum caudatum, leaves on the stem. Amarantus spinosus, leaf and flower. Buddleia Madagascariensis, leaf and stem. Ceynodon dactylon, stems. Davalia terminifolia, leaves and stem. Tomatophyllum reflexium, leaf, flower, and seed-vessel. Solanum angline, berry, stem, and leaf. Spilanthus Mauritiana, leaf and stem. Melia azedarach, bark and wood. Mussaenda crenata, leaf and stem. Stachitarpha Jamaciensis, leaf and stem. Partheneum hysteraphorus, flower. Tetranthera laurifolia, leaf. Draciana ferrea, stem. Desmodium cæspijosum, leaf and stem. Cardiosperdum balicacabum, stem and leaf. Cacalia flexuosa, leaf and stem. Red Bark, quill. Andraphogon schœnanthus, bark. Cassia rumphiana, leaf bound with strips of bark. Heliotropium Indicum, leaf and stem. Eupatorium ayaparra, leaf and stem. Toddalia aculata, leaf and stem. Polypodium phymatodus, leaf and stem. Quisqualis Indica, leaf and fruit. Trisbemma virusamun, leaf and stem. Quivisia heterophylla, bark. Vinca rosea, stem. Hura crepitans, leaf. Hematoxylon Campechianum, leaf. Cassitha filiformis, root. Albeus praccatorius, root and stem.

K. Jourde, Esq., Mauritius. One sample of Vanilla, very good. Long crystals of Vanillic Acid on the surface, tied transversely with three strips of vegetable fibre.

GOLD COAST PRODUCTS.

Oils.—Specimens of oils made at Cape Coast from African nuts and seeds, by W. Melton, etc., viz.: One glass barrel Palm Oil. Palm Oil, cold drawn. Palm Oil, cold drawn, refined. Palm Oil for domestic use by boiling. Palm Kernel or Black Oil, native make. Palm Kernel Oil, cold drawn, refined. Benne Seed Oil. Egusi or Bitter Gourd-seed Oil. Physic Nut Oil. Groundnut Oil. Cocoanut Oil. Palm Oil Nuts. Palm Oil Nut Kernels. Sesamum. Benne Egusi or Bitter Gourd Seeds. Groundnut Kernels. Jatropha Curcas. Physic Nuts. Palm Nut Rings, made from the shell of the palm nut One barrel Palm Kernels. Guinea Grains, or Grains of Paradise. Aromatic Pepper, from the Niger. Edible Red Beans. Coffee, grown in eight months after planting the seed, by Mrs. Davison, colonial schoolmistress. Kreppee, or Bitter Oil Nuts; the oil a remedy against the Tetse fly, and all other insects. One bowl containing two masses Fragrant Gum, used for polishing and perfuming the skin after washing. Two cakes Beeswax. "Mahogany" Nuts, containing a very oleaginous kernel. One fine specimen of Gum Copal, Accra, and specimens of Gum Copal, Accra.

Starch.—Cassava Starch. Arrowroot, grown at Cape Coast by Mr. Nugent, pensioner.

SEYCHELLES DRUGS.

Lemarchand, Archipelago of Seychelles. Four and a quarter pounds of Cacao Beans. One pound and a half of Cloves. One pound of Vanilla.

CANADIAN PRODUCTS.

Oatmeals, exhibited by Martin & Sons, Mount Forest; James Wilson, Fergus; Scott & Co., Highgate; Muirhead & Grey, London; Aspden & Pritchard, London; Thomas McKay, Ottawa; Hayward & Jenkinson, Victoria. Canada Balsam, Resin Abies, Hemlock Bark, Tolby, Victoria.

NETHERLANDS DRUGS.

Netherlands East India Colonies.—Cultivation of the Cinchonas, represented by plants. Eight distinct species of Cinchona: Cinchona micrantha, C. Hasskarliana, C. lancifolia, C. officinalis, C. caloptera, C. succiruhra, C. calisaya, C. pahudiana. Nine photographs are shown, of views of different cinchona plantations in Java. One of a propagating house, where the young plants are nursed until they are fit to be transplanted to the grove, and also a view of a number of workmen stripping the bark; and one showing how the bark is dried and packed. A log two feet long, covered with the bark, with one end cut so as to show a longitudinal and a transverse section. Samples of bark of each variety; several being in bales. A display of the cinchona alkaloids, obtained from the barks, in various stages of purity. These preparations were manufactured in Java, the whole forming the most instructive and complete cinchona display in the whole Exhibition. The government exhibits also Gum Dammar, Catechu, Gutta-percha, Gutta Gitang, Gutta Socsoe, India-rubber, Agaragar, Gum Benzoin, Camphor, Dragon's Blood, Cacao Beans, Nutmegs, White and Black Peppers, Mace, Cloves, Edible Birds' Nests, Wax, Arrowroot, Sente, Ketella, Red Obi, Cassava, Sago, Kajoepoeti, Macassar and Tekewan Oils.

GERMAN DRUGS.

J. Bernhardi, Leipsic, wholesale business in Vegetables, Seeds, and Essential Oils. Manufactory of Essential Oils and Essences in Neuschönefeld, near Leipsic: Anise, Coriander, Fennel, and Caraway Seeds; Elder, Buck, Wheat, and Juniper Berries; Black Mallow Flowers; German Chamomiles; Roman Chamomiles; other Medicinal Flowers; various Medicinal Herbs; Gentian Roots; various other Medicinal Roots, Barks, Mosses, etc.; Minerals, etc., as Antimony, Arsenic, Asbestos, Manganite, Steatite. Further manufactured articles, especially Anise, Coriander, Fennel, and Caraway Oils; Arac, Cogniac, and Rum Essences; Fruit Ethers; Distilled Medicinal Water; Tinctures, and Pharmaceutical Extracts prepared in vacuum.

AUSTRIAN DRUGS.

Insect Powders, exhibited by John Zacherl and Wartpabrikoff Brothers, Vienna. Drugs, Medicinal Powders, etc., F. Wilhelm & Co., Vienna.

ITALIAN DRUGS.

Licorice, exhibited by Gulli Gaetano, Musumeci Catania; Rocco Giacomazzi, Trapani, Italy; Antonino Pirrone, Gaetano, Messina; Giovanni Grimaldi, Paterno, Sicily; Giuseppe Grasso, Catania, Italy. Licorice Paste, Giuseppe Catanzaro, Termini, Palermo.

EGYPTIAN DRUGS.

Samples of Gums, exhibited by Mr. Heller, Egypt.

ORANGE FREE STATE DRUGS.

Cream of Tartar Fruit, Adansonia spec., Orange Free State.

THE CHINESE EXHIBIT OF MATERIA MEDICA.

Ginger, Dried. A stomachic. From Szechuen prov.

Cantharides. Used for blistering purposes, and in hydrophobia. From Szechuen prov.

The Berry of Copaiba. A stomachic, and used in certain forms of gonorrhœa. From Hupeh prov.

Orange Peel. From Kwangtung prov.

Peppermint Leaf. From Kwangtung prov.

A greenish-black micaceous mineral, believed to remove phlegm, etc. From Kwangtung prov.

Peppermint Ice. A camphoraceous substance which separates from the peppermint oils at a low temperature. In common with Laurel Camphor it possesses the property in a high degree of analyzing polarized light. Thirty catties of oil are said to produce four catties of ice. The oil after the separation is sold as inferior. From Kwangtung prov.

Cassia Buds. From Kwangtung prov.

Pumelo Peel. The sun-dried peel of the Citrus decumana of Risso, shaddock or pumelo; of a bitter but aromatic taste. A stomachic and purgative. From Kwangtung prov.

Peppermint Oil. Made from several varieties of mint, and sold in small bottles. It is applied to the forehead in headache, and is put into peppermint lozenges to be sold in the streets. From Canton City.

Dried Lizards. From Kwangtung prov.

Syngnathidæ, Syngnathus. From Kwangtung prov.

The Root of the Dolichos Trilobus. A febrifuge. From Kwangtung prov.

The fruit of a plant; an extremely disagreeable, astringent, and bitter taste. From Kwangtung prov.

Red Beans, Crabs' Eyes. The berry of a leguminous shrub, growing to the height of several feet in the south of China. Used as beads by Chinese children. They are believed to prevent the evaporation of camphor when kept with it. From Kwangtung prov.

Ginseng, Reclarified. Panax amerigo, reclarified in Canton for re-exportation. A tonic.

The fruit of the Bitter-seeded Cardamom, Amomum amarum. Supposed to increase knowledge (as the Chinese characters of its name signify) by strengthening the stomach, with which the Chinese connect a person's disposition and mental capacity. From Kwangtung prov.

The fruit of a kind of Cardamom, Amomum globosum. From Kwangtung prov.

Wild Ginger Seed. The fruit of a kind of Bitter-seeded Cardamom, Alpinia officinalis. From Kwangtung prov.

The dried skin of a certain kind of orange growing in the southwest of Kwangtung. Made into a tincture esteemed in the central and northern provinces as a sedative, carminative, stomachic, and expectorant remedy.

Golden Grass. From Kwangtung prov.

The seeds of a variety of melons; of a disagreeable and bitter taste. From Kwangtung prov.

The dried blossoms of the Chu-lan plant, Chloranthus inconspicuus. Canton custom places these flowers amongst the medicines, but they are rather used to scent tea than for pharmaceutical purposes. It is particularly the Chu-lan tea, the scented caper of commerce, which owes its flavor to this flower. From Kwangtung prov.

As an eye wash or lotion. From Kiangsu prov.

The peel of the local genus of lemon. From Kiangsu prov.

Leaves of a tree called by the Chinese Fung-shu, yielding a resin called Rose Maloes. From Kiangsu prov.

The woody matter of the Peony Shrub reduced to powder. From Anhwei prov.

Dried Lily Flowers. The dried flowers of Hemerocallis graminea and of Lilium bulbiferum; they are usually twisted into lengths of four or five inches; the color is of a dark brownish-yellow, covered by a whitish bloom. Of considerable repute as a medicine in pulmonary affections, also largely employed in cookery as a tonic or relish with meat dishes. From Shantung prov.

White Nuts. The seeds of Salisburia adiantifolia. From Kiangsu prov.

Pumpkin Rind. A demulcent used for gonorrhœa. From Kiangsu prov.

Safflower. The dried red flowers of the Carthamus tinctorius. A stimulant, sedative; also used to cause abortion. Used as a dye, and as a component in the manufacture of rouge. From Honan prov.

Honeysuckle. A shrub, the dried flowers of which resemble tobacco in odor. Used in cases of rheumatism. From Kiangsu prov.

Dogbane. Taken in certain diseases of the kidneys, and reputed to possess tonic, astringent, styptic, and antisyphilitic properties. From Kiangsu prov.

The spines of the Gleditschia chinensis. An anthelmintic and purgative. From Kiangsu prov.

Almonds. Kernels of fruit of the sweet variety of the genus Amygdalus, said to be sedative, antispasmodic. Used in confectionery. From Kiangsu prov.

Buckthorn Berries, Kernels. Kernels of a species of Rhamnus. A stomachic, tonic, and sedative.

Thorn Seeds. Seeds of a high thorn, extensively grown in Kiangsu province, and used as a hedge tree; are inclosed in a pea-like pod; seeds flat, shining, and resembling linseed of a dark color. Taken in infusion as a restorative after a drinking bout.

The worms of the silk cocoon. From Kiangsu prov.

Buds of Cassia Sophora. The buds considered to be tonic and astringent; the leaves are cathartic, stimulating the action of the liver and kidneys. Also used as a yellow dye to stain wood. From Anhwei prov.

Melon Seeds. Decocted with other medicines. Taken for coughs, colds, asthma, etc. An aperient. From Kiangsu prov.

Sun-dried Root of Convolvulus. Used as a cheap substitute for the true ginseng; prescribed in cases of spermatorrhœa, debility, and severe dyspepsia. From Kiangsu prov.

Root of Pæonia albiflora. A tonic, sedative, and alterative. From Anhwei prov.

Name unknown. From Kiangsu prov.

Endive Stalks. The petiole with the continuation of ribs and veins of the endive or chicory leaf. A tonic, antiscorbutic, and as a remedy for piles. From Kiangsu prov.

Pumpkin Seeds. The dried seeds of various sorts of melons. In decoction. Possess soothing properties and are used in cases of colic, spasms, etc. From Kiangsu prov.

Euryale ferox. A tonic. From Kiangsu prov.

Root of Dolichos trilobus. Emetic, antiphlogistic, and febrifuge. From Kiangsu prov.

The grain or fruit of the Coix lachrymalis and Coix exaltata, being an excellent substitute for pearl barley. Native doctors recommend the seeds for phthisis and other lung diseases. Pectoral, cooling, demulcent, and nutrient properties are generally attributed to the infusion made from them. From Anhwei prov.

Medicine Tea. Is a brick-shaped medicine composed of sundry aromatic herbs; it is prepared like tea for beverage, hence the name, though there is no tea in it. From Fukien prov.

Name unknown. Administered for the removal of infantile obstructions, and considered beneficial in cases of marasmus. From North Formosa.

The husk of the cardamom, imported from India, from Singapore and Penang. As an antispasmodic. From Fukien prov.

Root of a species of Madder, Rubia munjista. A tonic. From Kiangsu prov.

The root of a scitamineous plant, held in high reputation amongst military men for the vulnerary qualities generally attributed to it. From Kwangtung prov.

Dried root-bark of the Berberis lycium. Used (in the form of a tincture) in cases of remittent fevers and debility, and to it are attributed many of the properties of quinine. From Szechuen prov.

Artemisia abrotanum. Taken in catarrh, etc. From Fukien prov.

Fruit of wild Berberis lycium. The leaves, fruit, and young shoots are all used in medicine, and an infusion from them is prescribed in nervous headaches, fatigue, and in feverish excitement. The juice of the fresh fruit is applied to inflamed eyes. From Kiangsu prov.

Cinnamon, but thicker and more fleshy than the foreign article, used to flavor medicine and condiments.

The under shell of the land turtle. Strengthening and stimulant. Taken in decoction by the old and the weak. From Kiangsu prov.

China-root. Found growing like a fungus from the roots of fir trees, or in the ground apart from the trees, and appears to be caused by a disease in the roots. The taste of the fresh root is sharp and bitterish, and the cut surface smooth, close-grained, glossy, and flesh-colored. In China it has been long used as a remedy in syphilitic diseases, and in medicine generally. It is supposed to possess tonic, cooling, stomachic, sedative, and diuretic qualities, even superior to the West Indian and South American Sarsaparilla. From Szechuen prov.

Bellwort. Root of the Platycodon grandiflorum. A tonic and stomachic; taken for syphilis. From Kiangsu prov.

Uncaria Gambir. Used in infantile diseases. From Fukien prov.

Rhizome of the bamboo. A demulcent, tonic, sedative, etc. From Fukien prov.

Cassia Lignea. Bark of the Cinnamomum Cassia. The bark is stripped off by running a knife along the branch on both sides, and then gradually loosening it; after it is taken off it is suffered to lie for 24 hours, during which time it undergoes a kind of fermentation, and the epidermis is easily scraped off. The bark soon dries into the quilled shape in which it is brought to market. Used to flavor medicine and in making incense. From Kwangtung prov.

Seeds of several species of Amomum, of which the Amomum Grana Paradisi furnishes the best, imported from India and the Malayan Archipelago. A stomachic and stimulant; used also to flavor spirituous liquors and in cookery. From Singapore and Penang.

Dendrobium ceraia, a sort of orchis, which grows on stone. A tonic and aperient.

Mustard Seed. A stimulant and stomachic. From Kiangsu prov.

Peony Bark. The bark of the root of the Pæonia moutan. Taken for congestion, blood diseases, etc. From Anhwei prov.

A sort of algæ plant. Taken internally as a remedy for dropsy, goitre, etc. From Fukien prov.

Licorice. The dried roots of the leguminous plants Glycyrrhiza glabra and Glycyrrhiza echinata; they are long, slender, and fibrous, of a grayish-brown color externally and yellow internally, juicy and sweet to the taste. Its importance in Chinese pharmacy is next only to that of ginseng, and to it are attributed rejuvenating and highly nutritive qualities. From Szechuen prov.

Syngnathidæ Hippocampus, imported from Hainan and Straits. A stimulant. From Kwangtung prov.

The small reddish-black mucilaginous seed of the Plantago major. A diuretic, tonic, and antirheumatic dose. From Szechuen prov.

Betonica officinalis. It is curious to note that this remedy is recommended both in the Herbarium of Apuleius and in the "Pên-tsau," the Chinese pharmacopœia, as a remedy for the effects of drunken debauch. From Kwangtung prov.

Safflower. Flowers of the Hibiscus rosa-sinensis. A tonic, also used as a red dye, principally for dyeing silk. From Szechuen prov.

Fragments of fossil crabs. They are crushed, powdered, and finally levigated, to be used in opacities and other affections of the eye. From Kwangtung prov.

Dung Beetle Skins. From Kiangsu prov.

Mulberry Bark. A styptic. From Kiangsu prov.

Salvia Multiorhiza. The root of this plant is sold in short, thick pieces of a brick-red color; in taste it is sweetish, and somewhat resembles licorice. An alterative and antispasmodic. From Szechuen prov.

Galangal. The root of the Alpinia galanga. Good roots are of a reddish-brown outside and a pale red where cut, full, plump, and have a peppery, aromatic taste. Used in diseases of the chest, and as seasoning in cooking and brewing. From Siam.

Croton Bean. A cathartic. From Szechuen prov.

Midsummer Root, a sort of aroid plant. In its fresh state it acts as an emetic; the prepared drug is given in fevers, rheumatism, etc. From Ningpo and suburbs.

Gentian Root, Centaury erythrœa Sp. (Gentianaceæ). A cooling and arthritic remedy; used in eye complaints; an aperient. From Kiangsu prov.

Scales of the Armadillo. For cutaneous diseases. From Fukien prov.

Seeds of the Amomum medium. As a stomachic, to give pungent flavor to spirituous liquors, and as a stimulant in ague. From Japan.

Rehmannia Chinensis. The root of this plant is repeatedly steamed and sun-dried; it then presents a dark, soft, wrinkled appearance; is about three inches in length and has a sweetish taste. Prescribed as a cooling and purifying drug. From Szechuen prov.

Stone Lotus-nuts. Seed of a variety of the lotus, named "stone lotus," from the hardness of the skin. Possessing cooling properties. From Kwangtung prov.

Rhubarb. The rhubarb of commerce, as has been lately discovered, is the root of a species of Rheum, hitherto unknown to botanists. The specimens produced from buds of the best Thibetan rhubarb, procured in 1867, by Mr. P. Dabry, then French Consul in Hankow, have been examined in Europe, and are described as Rheum officinale. In former times Canton was the only port from which this drug was exported, but now only a small quantity reaches the port by sea, *via* Shanghai, to be dried at Canton and then to be re-exported. The varieties known in commerce depend on the age of the roots, the soil, and care used in curing it. The Chinese dig the roots early in spring, before the leaves appear, cut them into long flat pieces, dry them for two or three days in the shade, and then string them on cords to dry thoroughly in cool places. Good rhubarb is yellowish, of a firm texture; when cut has a lively reddish-white mottled appearance, and is perfectly dry. The taste is bitter and unpleasant, and the smell somewhat aromatic. Possesses cooling, laxative, alterative, stomachic, astringent, emmenagogue, eliminative, deobstruent, and diuretic qualities. From Szechuen prov.

Cypress Cone Seeds. The kernels of this fruit have a pungent smell, are oily, and of a yellowish color. A purgative, tonic, and stimulant. From Szechuen prov.

Lotus Stamens. Of value in cases of spermatorrhœa. From the dried stems arrowroot is prepared. From Anhwei prov.

The roots of a liliaceous plant, Anemarhena asphodeloides. A cooling, lenitive expectorant and diuretic medicine. From Kwangtung prov.

Salvia Plebia. Prescribed in catarrh and dysentery. From Fukien prov.

Turmeric. The dried root of the Curcuma longa; the roots are uneven and knotty, difficult to break or cut, and have a light yellow color externally. Sold generally in form of powder. Used for certain diseases of the skin, as a yellow dye, in preparation of tobacco, and mixed with indigo or Prussian blue to color green tea; also to season curries. From Fukien prov.

Knot Grass Seed. A stomachic, taken also for epileptic, bronchial, asthmatic, and urinary affections. From Kiangsu prov.

Anchusa tinctoria, or Alkanna tinctoria. Used to bring out the eruption of small-pox and to color candles. From Honan prov.

Fowl's Gizzard. The lining membrane of the gizzard of the common fowl, peeled off and dried. It presents a wrinkled or plicated surface; is yellow or brown in color, brittle in texture, and has portions of grain eaten by the fowl still adherent. It is prescribed in dyspepsia, diarrhœa, spermatorrhœa, and urinary disorders. The male bird is used for preparing the drug for female patients, and *vice versa*. From Kwangtung prov.

Golden Grass. Decocted with tan bark and other medicines. Possesses cooling and purifying properties. From Kwangtung prov.

Bryony Root. To cool the blood in treatment of ulcers and pectoral and stomachic disorders. From Kiangsu and Szechuen prov.

Atractylodes rubra. The leaves are smaller than those of the white variety; the roots are met with in finger-shaped pieces, the skin is rough and of a brown color, the surface is of a dirty white; of a warm and aromatic taste. Supposed to be very strengthening and to be conducive to longevity. A diaphoretic, in treatment of rheumatism, lumbago, neuralgia, etc. From Szechuen prov.

Dried Root of Angelica. A diaphoretic. From Fukien prov.

Rind of the fruit of a thorny kind of tree. A cure for consumption, colds, asthma. Cure for boils, and used to strengthen the hair. From Szechuen prov.

A plant resembling the Chrysanthemum. Used in affections of the eyes, and as an antidote to the poisonous effects of opium. From Szechuen prov.

To check internal hæmorrhage and for coughs and colds. From Hangchow-fu, Chêhkiang.

Caterpillar. As a purgative and antispasmodic. From Szechuen prov.

The common Hedgehog's Skin. Decocted for pulmonary complaints. Powdered and made into pills for cutaneous diseases. From Szechuen prov.

Fruit of Forsythia suspensa. An antispasmodic and sedative. From Szechuen prov.

Roses. Taken internally in asthmatic complaints; eaten as a pickle or preserve, and used to flavor medicine. From Kiangsu prov.

Dried roots of Gendarussa. Boiled in milk given in cases of rheumatism, fever, etc. From Szechuen prov.

Castor Oil Beans. The broken kernels of the nuts are applied in the form of a poultice to wounds, cuts, etc.; the oil expressed from them is used in the manufacture of candles. From Kiangsu prov.

Kernel of Trichosanthes dioica. A demulcent. From Kiangsu prov.

A Seed. For affections of the throat. From Kiangsu prov.

Melon Peel. Decocted with other medicines, it is taken for coughs, colds, and asthma. An aperient. From Kiangsu prov.

Seeds of Cuscuta (Dodder). A tonic and diaphoretic. From Szechuen prov.

Found in contorted quilled pieces of a brown color. A tonic. From Szechuen prov.

Orange Peel. Taken for coughs and catarrh. From Kwangtung prov.

The inner part of the Skin of the Orange. Used medicinally and to flavor food. From Szechuen prov.

A decoction of Centipedes is used in gonorrhœa; powdered they are applied externally to venereal sores. From Chêhkiang prov.

Bark of a tree. A febrifuge; also given in consumption, indigestion, and dysentery. From T'aichow-fu, Chêhkiang prov.

The bitter kernels of the Cerasus communis; taken for dropsy and rheumatism. From Szechuen prov.

Leek Seeds. Boiled in spirits they are taken inwardly for neuralgia, rheumatism, etc. From Kiangsu prov.

The fruit of a species of Rhamnus, probably the Rhamnus soporiferus. A soporific. From Szechuen prov.

A gelatin, made by boiling down deer horns. A tonic. From Shantung prov.

Peach Kernels. Taken for coughs, blood diseases, and rheumatism. From Szechuen prov.

Orange Seeds, dried. Used medicinally and to flavor food. From Szechuen prov.

Seeds of Celosia argentea. An anthelmintic and tonic. The bruised seeds are stuffed into the nostrils in epistaxis. From Kiangsu prov.

The root of Aconitum. Taken in fevers, leprosy, etc. An antidote to poison. From Szechuen prov.

A species of Plum. Medicinal properties unknown; used also as a dye. From Szechuen prov.

A demulcent and remedy for coughs and colds. From Szechuen prov.

Fruit of a Rosa canina. A conserve. From Shantung prov.

Mineral Salt. An alterative. From Szechuen prov.

Dried Urine, human. Is given in pulmonary complaints. Possesses demulcent properties. Taken internally it is supposed to cure debility and as a lotion is good for weak or sore eyes. Eggs boiled in boy's urine are also considered very strengthening. From Szechuen prov.

Robinia amara. A tonic. From Shaohing-fu, Chêhkiang prov.

Angelica. An antispasmodic, purgative; and taken for asthma. From Shaohing-fu, Chêhkiang prov.

The root of Atractylodes alba. Is met with in hard contorted pieces of an inch or so in diameter. The outer surface is brown and wrinkled, the interior of a whitish-yellow color. The odor is strongly aromatic and the taste aromatic and slightly sweet. A tea is made from the roots which is supposed to possess stomachic and tonic qualities. From T'aichow-fu, Chêhkiang prov.

Seed. Prescribed for tumefaction of the veins. From Chêhkiang prov., 1st quality.

Tansy. Taken in decoction for cutaneous diseases. From Shaohing-fu, Chêhkiang prov.

A tonic and astringent, used to check vomiting, also as a condiment. From Szechuen prov.

The bark of the root of Aralia palmata. Taken for rheumatism and syphilis. From Shangtung prov.

Capoor Cutchery. Is half an inch and more in diameter, and is cut into small pieces and dried for exportation; the cleavage is covered with a fine, reddish pellicle, but externally it is rough and of a reddish color. It has a pungent and bitterish taste and a slight aromatic smell. Powdered and mixed with oil, it is employed in friction and plasters; used also in perfumery and to preserve clothes from insects. From Szechuen prov.

Red Hæmatite. A cordial and tonic and used as a pigment. From Szechuen prov.

Peppermint. A carminative, antispasmodic, and also used for tea. From Szechuen prov.

Hartall, Orpiment. An alloy of white arsenic and sulphur, found in the southwestern parts of China, whence it is sometimes carried overland to Bangkok and Ava and thence exported abroad. Yellow paint. From Szechuen prov.

Cocoon of a Caterpillar. Used in inflammation of the eyes.

Bluestone. In powder applied to sores, etc.; as a lotion applied to bad eyes; used also as an injection. Astringent, vulnerary, etc. From Szechuen prov.

Mother Cloves. Seed of the clove tree imported from India and the Straits. Used as a spice and in the form of a tincture as a hair wash; taken in colic. From Singapore and Penang.

The dried buds of the clove tree, Caryophyllus aromaticus. Imported from India and the Straits. Used as spice and several medicinal purposes. An oil or essence is made from them. From Hainan.

Musk, which is used as a perfume, and as a stimulating and antispasmodic medicine, is the dried secretion of the preputial follicles of a species of antelope, probably the Moschus Moschiferus of Linnæus. Good musk is of a dark purplish color, dry and light, and generally in smooth, unctuous grains. Its taste is bitter and its smell strong and aromatic. It is procured from Chihli, Szechuen, and Kiangsu, also from Silung-chow in Kwangsi, and Wuting-chow in Yünnan; the two latter places are however only the chief markets for the musk produced in Annam and Thibet. The musk exported from Shanghai is the scrotum of the Musk Deer in its natural state, carefully packed in small leaden boxes, each box containing one scrotum. From Shantung prov.

Lucraban Seeds (imported from Siam). They are nearly an inch long, consisting of a hard woody outer shell, to whose surface the pulp or rind adheres. The oily albumen incloses heart-shaped leafy cotyledons. Cure for leprosy. The powdered oily nucleus of the seed is administered in doses of a drachm twice a day for four months, and the expressed oil occasionally rubbed on the skin. From Singapore and Penang.

Seeds of Cassia tora. A remedy for ophthalmia. From Kiangsu prov.

The extreme and tender ends of the branches of the Cassia tree, imported chiefly from Straits. Taken to relieve dyspnœa and in coughs and colds, to promote perspiration, and used as a spice. From Hainan.

Seeds of a kind of creeper pulverized and taken as snuff. From Kiangsu prov.

A sort of quartz. Used in lung diseases, jaundice, and rheumatism. From Kiangsu prov.

A species of Tribulus terrestris. A diuretic. From Szechuen prov.

Dried stem of Ephedra flava. A diaphoretic. From Szechuen prov.

A tonic, much valued as an aid to digestion. From Chêhkiang prov.

A liliaceous drug-yielding plant, consisting of shrivelled, flexible tubers of a yellowish color and sweetish taste. A tonic. From Chêhkiang prov.

The seeds of a tree said to harbor the wax insects. A laxative. From Szechuen prov.

Flowers. Taken for flatulency. From Szechuen prov.

The Flowers of Chrysanthemum album and flavum, which are of the same use. Antivinous. From Kiangsu prov.

Rubus idæus (Wild Raspberry). An astringent and ophthalmic remedy. From Shaohing-fu, Chêhkiang prov.

A tonic, and much valued as an aid to digestion. From Chêhkiang prov.

Calcined Lead. To adulterate or as a substitute for vermilion, and is employed to a certain extent by glass-makers and painters. From Canton.

Shells of the edible fresh-water turtle. Strengthening and stimulant. Taken in decoction by the old and weak. From Szechuen prov.

The horns of a small species of antelope (chamois) found on the plains of Mongolia. A cooling medicine, supposed to cure inflammation of the lungs and liver. From Shangtung prov.

Dried root-stock of Bupleurum octoradiatum. An emmenagogue. From Szechuen prov.

Gum Olibanum. Obtained by incision from the Boswellia serrata and glabra, imported from India and Straits. In decoction a stimulant, tonic, etc., employed in powdered form to wounds as a purifier and healer, used also in preparation of incense. From Canton.

The dried resinous substance which covers the fruit of the Calamus draco, a sort of rattan growing in Sumatra, and is obtained by beating the fruit in little baskets. Imported from Malayan Archipelago. A tonic and astringent; also in preparation of paints and varnish, etc. From Canton.

Strengthening medicine, possessing the qualities of ginseng in an inferior degree. A tonic. From Szechuen prov.

A Pepperwort, the small red carpels of which inclose the black shining seed, of an aromatic odor and a peculiar pungent flavor, with an acrid aftertaste. A stimulant, stomachic, and astringent, and used for seasoning purposes. From Szechuen prov.

Bark of Pterocarpus flavus. A tonic and diuretic, and used as a yellow dye for silk. From Shaohing-fu, Chêkiang prov.

Lophanthus. Used in struma, blood diseases, and affections of the eyes. From Ningpo and suburbs.

An excrescence found on the trunk of the Liquidambar tree, a genus of the order of Altingiaceæ. Tuberiform and of irregular size; the cuticle is of a dark-brown color, rough, and often wormeaten; the interior is of a yellowish-brown hue. Recommended as a cure for urinary disorders, fluxes, etc. From Szechuen prov.

Dried Root and Stem of Cicuta. From Szechuen prov.

A Flower. Taken for cold in the head. From Kiangsu prov.

A remedy for colic and flatulency. From Szechuen prov.

Libanotis. The root is sold in long brownish-yellow irregular pieces. It has a sweetish and aromatic taste. Prescribed in catarrh, rheumatism, leprosy, etc. From Szechuen prov.

Scraped Bark of various kinds of Bamboo. An astringent. From Chêhkiang prov.

Berries. Taken for inflammation of the eyes. From Chêhkiang prov.

Makes a strengthening but cooling decoction, etc. From Szechuen prov.

The Seeds of the black variety of Pharbitis. A purgative and diuretic.

The Berry of Vitex irisca. In catarrh, and to cool and purify the blood. From Kiangsu prov.

Taken for spermatorrhœa, and by women during pregnancy. From Manchuria.

A labiate plant, the light, spongy, yellowish roots of which are slightly bitter and mucilaginous. A febrifuge. From Szechuen prov.

A ranunculaceous plant; the root-stocks are met with in dark-brown irregular pieces bristled with rootlets; the taste is slightly bitter. Accredited with antidotal, tonic, and derivative properties. From Szechuen prov.

A kind of grass used as a purge. From Szechuen prov.

The bones of the tiger—the Leopardus brachyurus. Mixed with hartshorn and the plastron of the terrapin formed into a tonic jelly, which is much used in rheumatic affections of the joints, diseases of the bones, ague, and debility. From Szechuen province and India.

The desiccated leaves or sections of the bulbs of a species of tuberose. A cooling and soothing medicine for coughs, etc. From Suchow-fu, Kiangsu prov.

The Seeds of the white variety of Pharbitis convolvulus. A purgative and diuretic. From Kiangsu prov.

The leaf of the Betel Pepper, and the nut of the Areca catechu, imported from the Straits and Hainan, together constitute what is called ping-lang or betel-nut. The powdered betel-nut is prepared with sapanwood and lime, and wrapped in the leaf of the betel pepper. Betel (growing also in the south of China) is chewed as a tonic by the middle and lower classes. A stomachic, and to preserve the teeth. From Singapore and Penang.

Dried woody stem of wild Clematis vitalba. Medicinal properties unknown.

Inula Chinensis. A stomachic. From T'aichow-fu Chêhkiang prov.

Used in hæmoptysis, colic, etc. The juice or coarse powder is applied to carbuncles, buboes, deaf ears, and sore eyes. Stimulant, tonic, antispasmodic, sedative, stomachic, etc., in its properties. From Ningpo and suburbs.

Caterpillar. In bronchial complaints. From Shaohing-fu, Chêhkiang prov.

Snake Skin. For small-pox, and as a carminative. From Ningpo and suburbs.

A species of Iris, very fragrant. A diaphoretic, disinfectant decoction. Taken for rheumatism, lumbago, neuralgia, etc. Used also in preparation of vermilion ink. From Chêhkiang prov.

Petrified Crabs. For boils, sores, etc. From Kiangsu prov.

Seed of a plant. Carminative. From Shaohing-fu, Chêhkiang prov.

Root of a plant. For skin disease. From T'aichow-fu, Chêhkiang prov.

Dried Cow's Gall. Expectorant. From Szechuen prov.

Clam Shells. Cathartic. From Kiangsu prov.

A mineral. For venereal diseases. From Szechuen prov.

Root of an herb. Prophylactic against poison. From Szechuen prov.

Root of a shrub. For sore throat. From Szechuen prov.

Root of a plant. Diuretic. From Szechuen prov.

Root of a plant. Stimulant. From Szechuen prov.

Bark of a tree. Tonic. From Szechuen prov.

Watermelon Skin. For rheumatism. From Szechuen prov.

Orange Peel. Tonic. From Fukien prov.

Pearl Barley. Emollient. From Shantung prov.

Dried Mulberries. Tonic and carminative. From Kiangsu prov.

Oyster Shells. For deafness. From Ningpo and suburbs.

Skins of Common Snake. Carminative. From Ningpo and suburbs.

Turnip Seed. Digestive, tonic, and carminative. From Szechuen prov.

Leaves of the Bamboo. Purgative. From Ningpo and suburbs.

Stems and leaves of an herb. Febrifuge. From Szechuen prov.

Seed of a kind of Melon. Emmenagogue. From Szechuen prov.

Root of a shrub. For consumption. From Chêhkiang prov.

Backbones of the Cuttle-fish. Mixed with native wine for cancer. From Ningpo and suburbs.

Bark of a tree. An anodyne. From Ningpo and suburbs.

Root of the Ginseng Plant. Tonic. From Japan.

Seed of an herb. For venereal disease. From Szechuen prov.

Flowers of a shrub. Astringent. From Kiangsu prov.

Berries of a shrub. Emollient. From Szechuen prov.

Cow's Glue, made from Buffaloes' Hides. Sedative. From Kwangtung prov.

Refuse of Tobacco mixed with Straw. Stimulant. From Kiangsu prov.

Copper. For boils, sores, etc. From Szechuen prov.

Pills, made of Musk, Camphor, Baroos, etc., and covered with wax. Sedative and mild expectorant. From Kwangtung prov.

The Peel of uncultivated Pumelo. Expectorant. From Kwangtung prov.

Camphor. Anthelmintic. From Formosa and Japan.

Glue made from Asses' Hides. Tonic. From Shangtung prov.

Tortoise-shell Glue. Tonic. From Szechuen prov.

Freshwater Turtle-shell Glue. Tonic. From Szechuen prov.

Glue made from Tiger's Bones. Tonic. From Szechuen prov.

Stem and leaves of a shrub. Tonic for females in childbed. From Kiangsu prov.

Salted Scorpions. For small-pox. From Szechuen prov.

Berries of Cassia. Stimulant. From Kwangtung prov.

Citrons, dried (Citrum medica). Aperient. From Kwangtung prov.

Husk of Cardamoms. Stimulant. From Kwangtung prov.

Watermelon Seed. For enteric disease. From Kiangsu prov.

A mineral. For rheumatism, diuretic. From Kwangtung prov.

Berries of a weed. Tonic. From Kiangsu prov.

Pith of Aralia papyrifera. Tonic, diuretic. From Formosa.

Capoor Cutchery. Anthelmintic. From Kiangsu prov.

Hemp Seed. For enteric disease. From Szechuen prov.

Seed of Scrophularia Sp. Stimulant. From Szechuen prov.

Stem of a water plant. Tonic. From Shantung prov.

White Pea Husk. To arrest vomiting. From Kiangsu prov.

A sort of Cyperus esculentus. A stimulant, tonic, and stomachic. From Szechuen prov.

Garroo-wood, the Aquilaria agallochum. The tree furnishes the best perfume when diseased. An expectorant. Reduced to powder, mixed with cedar dust and clay, and manufactured into joss-sticks. Beads are also carved of it for its fragrance. From Singapore.

Amber. Taken in the form of powders for gonorrhœa and spermatorrhœa. Applied to ulcerated cornea. From Kiangsu prov.

Coral. Applied in powder to opacities of the cornea; an astringent for epistaxis. From Singapore.

Powdered Cornelian. Prescribed for ulcers of the cornea and syphilitic rheumatism. From Kwangtung prov.

Cinnabar is the sulphuret of mercury, also manufactured from quicksilver by the reaction of sulphur and saltpetre on the metal in small copper furnaces, in which it is collected after sublimation in acicular crystals. A sudorific (chiefly used in manufacture of red lacquer-ware). From Shanghai.

Adenaphora Sp. An expectorant in lung diseases; prescribed in affections of spleen and kidneys. From Shantung prov.

The peel of Citrus aurantium, Citrus nobilis, Citrus bigaradia, and Citrus margarita. Supposed to allay febrile action and to be possessed of stimulant, antispasmodic, antiphlegmatic, and other medicinal qualities. From Kiangsu prov.

Root of the Panax Ginseng. The Chinese consider it a most powerful and even life-prolonging medicine; hence the enormous price attached to a comparatively worthless drug. A tonic, prescribed for almost every disease. From Peking.

Corean Ginseng. A tonic. From Corea.

Deer Horns broken and boiled to the consistency of jelly. A stimulant in nervous ailments, for spermatorrhœa, leucorrhœa. From Newchwang.

Convolvulus or Bastard Ginseng. A tonic. From Kiangsu prov.

Camphor Baroos. A gum in its natural state found in camphor trees. Derives its name from Baroos, a town on the southwest coast of Sumatra, whence it is principally exported; applied externally for opacity of the cornea, deafness, polypus, internally as an anthelmintic. From Baroos.

Anteater's Scales. Used in rheumatism and to hasten eruption in smallpox. From Fukien prov.

Snake's Skin. To relieve itching in skin diseases, for piles, fistula. From Fukien prov.

Dried roots of Pæonia rubra. A carminative, emmenagogue. From Newchwang.

Aralia edulis. A tonic, prescribed in menstrual, chlorotic, and puerperal diseases of women. From Shanghai.

Sophora tomentosa. In great repute as a tonic, pectoral, and diuretic medicine. From Chihli prov.

Phytolacca octandra. An emetic and hydragogue. From North China.

Supposed to be Melanthium. An antiphlogistic, anthelmintic. From Kiangsu prov.

Dandelion. To disperse swellings. An antidote to poison. From North China.

Saccharum spicatum. A diuretic; for fever, hæmatemesis, jaundice, etc. From North China.

Phœnix Tail Grass. In treatment of the itch and for syphilis. From Kiangsu prov.

Leaf and stalk of Populus spinosa. A tonic in complaints of liver and kidneys. An aphrodisiac. From North China.

Hedysarum; for dysentery, hæmatemesis. From North China.

Leaf of Artemisia moxa. Ignited upon the skin to cauterize the part. From North China.

Fumitory. Used as an application to swellings and abscesses. From North China.

Leonurus sinensis. A tonic and alterative, and taken in menstrual complaints and pains of labor. From North China.

The inner part of the Cinnamomum Cassia. A stimulant for diarrhœa, liver complaint, etc. From Cochin China.

Cow Bezoar. A concretion found in the gall-bladder of several ruminant animals. A sedative and tonic. From Siam and Straits.

Scorpions preserved in salt. In tincture as a diaphoretic for rheumatism, paralysis, and ague. From North China.

Scrophularia Sp. A demulcent taken for cough and dyspepsia. From Fukien prov.

Honeysuckle. Taken internally as a remedy for rheumatism, syphilis, dropsy, etc., and applied as a poultice to abscesses, sores, etc. From Fukien prov.

Seed of Kadsura chinensis. A tonic and stomachic. From Fukien prov.

White Nuts. Taken for coughs, asthma, leucorrhœa, gonorrhœa. From Kiangsu prov.

A greenish-black Micaceous Mineral. An expectorant and remedy for dyspepsia. From North China.

Aconitum variegatum. An emmenagogue and rubefacient, and taken to cause abortion. From Szechuen prov.

The product of the Camphora officinarum. The chipped wood of the root, trunk, and branches is soaked in water and afterwards sublimated. A diaphoretic, carminative, etc. From Formosa.

Pèpà Leaf. Decoction taken for coughs, colds, sore throats, etc. From Changchow-fu, Fukien prov.

Honeysuckle Stalks. Taken in infusion as a remedy for rheumatism, syphilis, dropsy, etc. From Amoy.

Leeches. Not used alive; a decoction either in water or spirit of dried leeches is taken as a purgative, and is applied outwardly to bruises, etc. From Amoy.

The Kernel of Bitter Almonds. From Kiangsu prov.

Betel-nut Husk. From Straits and South China.

Dried Crab Apples. Stimulant, expectorant, to bring out small-pox eruption. From Kiangsu prov.

Seeds of Muricia Cochinchinese. Applied for bruises, swellings, and ulcers. From North China.

Limonite. Medicinally in former time as a lotion. From North China.

Magnolia Buds. Have a strong aromatic and bitter taste. Carminative, cephalic, stimulant, diaphoretic, and eliminating qualities are ascribed to them. Tonic, taken for fever, headache, toothache, etc. From Chêhkiang prov.

Xanthium Strumarium. An extract from the roots and leaves is given as a remedy for ulcers and leucorrhœa. From Fukien prov.

Pupalia geniculata. A cultivated species of Amarantaceæ. The exterior of the root is a dirty yellowish and the interior of a whitish color. It is irregular and open in structure, and is possessed of little flavor. Much esteemed as a remedy in rheumatic complaints, and in syphilitic pains, ague, fever, etc. From North China.

Rhinoceros Horns. The horns of the Sumatran and Siamese rhinoceros. Inferior sorts, which might be obtained from the two-horned rhinoceros of South Africa, are said to be imported from Bombay. Decoction of shavings taken in fever, small-pox, ophthalmia, hæmoptysis, etc. From Straits.

Medicine Stone. The stone is roasted, and afterwards put in the urine of a child; after having gone through the process seven times, the stone is dried and powdered. The powder is applied to ulcers and opacities of the cornea. From Szechuen prov.

Cardamoms. Tonic, carminative; taken after a wine debauch. From Siam.

A Pea. Taken in affections of the spleen, in diarrhœa. From Chêhkiang prov.

Dolichos trilobus. Taken in infusion in drunkenness. From Kwangtung prov.

Anthelmintic. In dyspepsia, in enlarged liver. From Kwangtung prov.

Aucklandia Costus. Anodyne, in dysentery and diarrhœa, applied externally to swellings. From India, Straits.

Mulberry Leaves. Taken in rheumatism, in eye diseases. From Kiangsu prov.

Nutmeg. Carminative, expectorant; an appetizer. From Straits.

Tuber of Arum pentaphyllum. Internally in rheumatism, tonic, scrofula; externally for scabies, ringworm, and snake-bite. To produce abortion. Before being taken inwardly, it must be mixed with ginger and water for forty-five days, and afterwards boiled over steam. From North China.

Bryonia. Sialagogue, febrifuge, emmenagogue. From Kiangsu prov.

Gentian. Prescribed for diarrhœa and dysentery, abscess, scabies, and scrofula. Externally, as a lotion in ophthalmia. From Szechuen prov.

Dried Toads. Tonic, sudorific. From Amoy.

Sweet Barbery. A tonic. From Fukien prov.

A Plant of Hair at Crown of Root. Locally to stop hæmorrhage. From Ts'üanchow-fu (Chinchew), Fukien prov.

A Root. Highly recommended in phthisis pulmonalis with hæmoptysis and hectic fever. The prescription is water 12 ounces, lean pork 4 ounces, powdered root 4 ounces; to be boiled and taken twice a day. From Ts'üanchow-fu (Chinchew), Fukien prov.

Melissa. Sudorific, carminative. From Amoy.

Plantago. In fever, hæmatemesis, ophthalmia, gonorrhœa. From Amoy.

Cicuta? In diarrhœa, dysentery, carminative. From Kiangsi prov.

Dried Lilies. Tonic of the kidneys.

Dried Root. In epistaxis and in hæmatemesis. From Ts'üanchow-fu (Chinchew), Fukien prov.

Taken for cystitis, dyspepsia, diarrhœa, dysentery. From Formosa.

Fungus. In prurigo of children, internally. From Kwangtung prov.

In gonorrhœa; ashes of burnt moss used as a styptic. From Amoy.

Seeds. Anodyne prescribed in hæmatemesis and dysentery. From North China.

Dried Flowers. Emmenagogue, blood tonic in leucorrhœa. From Amoy.

Heteropa Asaroides. Carminative, stimulant, sudorific. From Manchuria.

Gleditchia chinensis. Expectorant, anthelmintic. From North China.

Galls. Astringent. From Straits.

Winter Wheat. Demulcent, expectorant, diuretic in cancer of the lungs. From Kiangsu prov.

Ginger. Prescribed for hæmatemesis and puerperal fever. From Kiangsu prov.

Silk Worms. In cystitis; after being burnt, the ash is mixed with wine, and drunk in order to cause the bursting of abscesses. From North China.

Red Cardamoms. Carminative. From Straits.

Seeds. Taken internally for ophthalmia. From Kiangsu prov.

A Stone said to be found inside of Bamboo. Febrifuge, expectorant. From Kwangtung prov.

Seeds of Chenopod kochia. In inflammation of the bladder, in gonorrhœa. From North China.

Chrysanthemum. Febrifuge, in rheumatism. From Honan prov.

Native Nuts. Demulcent, anthelmintic. From Kwangtung prov.

Moss. In rheumatism of the joints. A thin slice of ginger is placed over the joint, and the moss is placed over the ginger and burnt. The result is an inflammation of the skin. In acupuncture, a needle is made red hot in burning moss, and thrust into the part. From Kiangsu prov.

The sprout in the centre of seeds of a species of Water Lily. A febrifuge, also prescribed for diarrhœa, dysentery. From Kiangsu prov.

Winter Wheat. Demulcent, a good laxative. From Kiangsu prov.

Seed. Emmenagogue. From Kiangsu prov.

Blossoms. Demulcent in ophthalmia. From Kiangsu prov.

A fruit of a plant of very disagreeable and bitter taste. Astringent, tonic. From Straits.

Rosa canina. Astringent, tonic. From North China.

Sweet Almonds. Expectorant, demulcent, antispasmodic, anthelmintic. From Chihli prov.

Peach Kernels. Tonic, laxative. From Kiangsu prov.

White Mustard Seed. Carminative, diaphoretic. From Ningpo.

Atractylodes alba. Tonic. From Suchow-fu, Kiangsu prov.

Fossilized Shells. Locally as a powder in ophthalmia and in scabies; internally in fever and in syphilis. From south coast of Hainan and Leichow-fu, in Kwangtung prov. Fossils.

Maggots. Prescribed in the delirium of fever and dysentery. From North China.

Anodyne for coughs and asthma. From Annam.

Bear's Gall-bladder. Prescribed for affections of the liver, ophthalmia. From Straits.

Asses' Glue. Tonic of liver and kidneys, stimulant. From Suchow-fu, Kiangsu prov.

Tiger's Skull. Taken in typhoid fever, ague, and rheumatic headache. Given to a person who has been bitten by a mad dog, to prevent hydrophobia. From Amoy.

Boys' urine, gypsum, and dew mixed and stirred with a piece of mulberry wood. This process is gone through several times. The resulting deposit is put on paper with lime underneath, and dried in the sun. It is then powdered, put in a small pot with water, and evaporated to dryness. Taken in phthisis, gonorrhœa, spermatorrhœa; used also as salt with rice. From China. Value at Amoy, 20 cents per catty.

Bamboo leaves. Antiphlogistic. From North China.

Dried Leaves of the Water Lily. Diuretic. From Amoy.

Dried Human Placenta. Tonic in consumption.

Old Ginseng. A general tonic. From Japan.

Foreign Ginseng. A tonic. From Straits.

Stalactite. In phthisis pulmonalis as a tonic; an aphrodisiac. From Formosa.

Oxide of Mercury. As a powder to ulcers in syphilis. From Amoy.

Midsummer Root. Taken for coughs and to give tone to liver and kidneys. From North China.

Resinous Ginseng. In hæmatemesis, epistaxis, and dysentery. From Suchow-fu, Kiangsu prov.

Calomel. Enters into most prescriptions for syphilis. From Kwangtung prov.

Pearls. Prescribed in affection of heart and liver; applied in the form of a powder to ulcers and opacities of the cornea; in deafness it is put into the interior of the ear; applied to pustules of small-pox. From Singapore.

An expectorant; made into an ointment and applied to external piles. From Singapore.

Oxide of Mercury. Powdered and applied to ulcers, especially syphilitic, in scabies to kill the insect; not used internally. From Ts'üanchow-fu (Chinchew), Fukien prov.

Nutmegs. The seed of an aromatic plant belonging to the species Amomum cardamomum. A stimulant, stomachic, and used for flavoring purposes. From Hainan.

Fungus. Lycoperdon giganticum, met with in Central China in damp and marshy ground, or adhering to rotten wood, but is most frequently found in rice fields after the grain has been harvested. Applied in form of a powder after the spores have been broken and carefully sifted, to dry up ulcers and sores. Taken in diseases of the lungs and throat. From Szechuen prov.

Corean Ginseng. Used in Chinese pharmacy as a panacea. From Corea.

Native Ginseng (wild and cultivated). Used in Chinese pharmacy as a panacea. From Manchuria.

Twenty-four kinds of medicine. The name in Latin and Chinese is written on the covering package of each. Used in Chinese pharmacy. From Newchwang.

JAPAN.

Japanese Drugs, Kuwangiyo-Riyo, Imperial Board of Agriculture, Tokio, Japan. Three hundred specimens of drugs, representing the advanced materia medica of Japan. Unlike the Chinese specimens of materia medica, there were none shown by Japan belonging to the animal kingdom, but amongst them we recognized a majority of drugs which are found in the pharmacies in American cities.

Indigo, Orange Peel, Chamomile, Bitter Almonds, Camphor, Ginger, Poppy Heads, Poppy Seed, Sweet Almonds, White Mustard Seed, Safflower, Ginseng, Turmeric, Castor Oil Seeds, Alkanet, Peach Kernels (three kinds), Salep, Pomegranate, Caraway, Coriander, Black Mustard Seed, Flax Seed, Veratrum viride? Matricaria, Stramonium, Rose Leaves, Orris Root, Aconite Leaves.

TRINIDAD.

Trinidad Products, Hy. Prestoe, Government Botanist, Trinidad. Nutmegs, one bottle fresh perfect fruits; Nutmegs, one bottle prepared perfect fruits; Cloves, one bottle fresh flower buds; Cloves and Nutmegs, one bottle mixed fresh; Mace, one bottle prepared.

ARGENTINE REPUBLIC.

Medicines, officinal; articles of the Materia Medica, Province of Mendoza. The Provincial Commission and Dr. Abraham Lemos.

(The medicinal herbs and plants of this country being as yet unknown to the scientific world, it has not been possible to classify them. The common or vulgar names are therefore given.)

Perlilla; used as a carminative. Yerba peluda; used as a carminative. Salvia silvestre, same quality as the sage; Salvia hispanica, L., but stronger. Arayan; dissolved in oil it is used instead of cajuput, for muscular rheumatism. Yarilla hembra; used as a plaster for luxations and fractures, and is efficacious in calming consequent inflammations. Duraznillo; a concentrated decoction of this herb is purging, and is used instead of tamarind. Tramontana; diuretic; the root is supposed to be antisyphilitic. Salvia silvestre. Yerba de la Virgen. Cardillo de la sierra; used for hepatic complaints. The extract of this herb is very generally used. Té de burro; carminative, and for indigestions. Zincilla. Papilla; this plant has a tubercle at the root, which gives a liquid efficacious for chronic ophthalmia. Topasaire; used as snuff. Amor seco; gives a yellow dye. Chinchil. Vidriera. Sanguinaria; diuretic. Name unknown. Cornu cabra; the charcoal of this plant is used for taking away skin-spots. Yerba del pollo; diuretic; it is used as sarsaparilla, and for curing dropsy. Blanquilla; saponaceous. Alfilerillo; febrifuge. Retamilla; diuretic, and for curing dropsy. Tornillo; frequently used as medicine. Yerba del leon. Artemisia; carminative. Molle; used in injections for blennorrhœa. Tupé; saponaceous; used as a hair-wash. Altamisa. Quillo-quillo; saponaceous; used as a medicine, and also for cleaning clothes. Duraznillo. Amores secos; medicinal; also a dye. Malva officinal. Zampa. Bledo. Vervena silvestre; the juice is used for headaches. Pichoa; medicinal; deadly poison for animals. Pichana. Fique; yellow dye. Usillo de la sierra; used instead of tea. Alhuzema (lavender). Pasto meloso. Cardo santo. The seed of this plant in doses of six grains is a purge, and is used for curing inflammation of the lungs. Vervena officinalis, known as cedron. Salvia; used for curing epilepsy. Arbusto. Artemisia; medicinal (duplicate). Tomatilla; used for poultices. Yerba mora. The tincture is efficacious for stopping coughs. Bejuco caustico; a strong blister; used for venomous bites of snakes or mad dogs. Penacho tintorial. Paico; carminative. The root, used in decoction, is efficacious for slaking thirst in fevers. Coralillo; purgative. Porotillo; medicinal. Cabello de angel. Cepacaballo; used for liver complaints. Artemisia (another variety of same plant). Altea. Yuyo amarillo. Mal de ojos. Yerba del platero; called by this name from its adaptability for polishing metals. Tembladerilla; flowers used for curing wounds. Hinojo. Apio silvestre; for calming the nerves. Tembladerilla, aquatic plant; the leaves are used in cases of inflammation. Suelda con suelda. Uvas de ruda. Romero. Yerba buena. Retamilla. Salvia blanca. Yarilla. Chilca dulce. Pasto natural de la Sierra ("natural grass from the mountains"). Yarilla macho. Llaullin blanco. Oreja de gato. Junquillo. Chamico (Stramonium officinalis). Tobacco plants. Pichoa. Matico; for curing wounds. Tamascan. The bulb on the root of this plant is worn round the neck by the natives as a preventive against disease. Mastuerzo; popular remedy for disease of the lungs. Yerba meona; diuretic. Penacho. Menta negra. Llaullin colorado. Molle. Molle, another variety. Retortuño; used for tanning, and as a cure for inflammations. Malvisco; diuretic. Terebinto, pimiento or Arbol de la esperma. Wild asparagus; diuretic. Moro multicaulis. Zarza blanca, aquatic plant. Carqueja; astringent. Palqui; for inflammatory fevers. Ajenjo. Jume; potash is extracted from this plant. Cardo santo roots; purgative. Contrayerba root.

Medardo Roman. Wild Fennel, Anethum fœniculum, L.

Province of San Luis. The Provincial Commission. Collection of medicinal herbs, as follows: Mentha piperita, Peppermint. Yerba sanguinaria; for purifying the blood. Quina ó saucecillo, sample of wood, leaves, and bark; this plant is well known. Vervena; for cicatrizing wounds. Meloncillo del campo; very aromatic. Girasol; for strengthening the eyesight; Cardo santo; the seed is an active purgative. Barba de piedra; for toothaches. Duraznillo del agua; for washing wounds. Tomillo; used in decoction for strengthening. Hojas de Tusca; for cicatrizing wounds. Topasaire; used as snuff and as medicine. Altamisa; used for purifying the blood. Malvisco. Doradilla, two classes; for purifying the blood. Salvia Laura; various medical applications. Vira-vira; for venomous bites. Sen silvestre; purgative. Carqueja; used for washing wounds. Escorzonera; sudorific. Calaguala; remedy for toothache. Usillo; sudorific. Matapulga; tonic. Poleo; used as tea. Zume; a preservative for the teeth, and is used by the Pampa Indians for slaking thirst. Quilcha malilla; for purifying the blood. Romero del campo. Cola de quirquincho; for strengthening. Llanten; sudorific. Vinagrillo; contains a large quantity of acid. Yerba del pollo; purgative. Flor de la noche; for washing wounds. Menta de Castilla; tonic. Malva, well known. Orozú; for indigestions. Toronjil; for disease of the heart. Culé; sudorific. Ruda; several applications. Azafran de Castilla; medicinal. Salvia disco; for rheumatism. Culantrillo chilenci; for purifying the blood. Clavel del campo; for rheumatic pains. Yerba del venado; disinfectant. Flor de sauco; sudorific. Cina-cina; used for baths instead of mustard. Yerba de la vibora; remedy for dysentery. Cedron. Laurel rosa. Fruit of chañar; remedy for asthma. Quebracho fruit; for caustics. Flaxseed. Castor-oil Seed.

Province of Catamarca, Angela Molina. Vira-vira. Salvia blanca; sudorific. Suico; narcotic. Arca; narcotic. Cedron de Puna; for chest diseases.

Fidel Iturbe. Carqueja; for venereal diseases. Yerba del ciervo; for venereal diseases. Muña-muña. Cola de leon; tonic. Salvia puna; for inhaling.

Gaudelupe Castelo. Yerba buena. Apio; narcotic. Flor de Corpus; fine fragrance. Salvia matico; medicinal herb.

Thomas Hurley. Doradilla; Escorzonera. Negrilla. Contrayerba. Ruibarbo, Wild Rhubarb. Remedio topasaire; for inhaling. Tola. Yerba medicinal. Chachacoma; used for curing heart disease. Arca; narcotic. Salvia morada; sudorific. Muña-muña. Tramontana; used as infusion for secret diseases. Viscol. Mechoachan; purgative. Quimpe; for preserving the teeth. Yareta. Cabello de angel. Chañar Bark; remedy for hæmorrhage.

Samuel A. Lafone Quevedo. Mastuerzo, seed of an herb found in the salt plains, and used as infusion with tramontana for curing blennorrhagia.

The Provincial Commission shows 95 specimens of drugs; no medicinal properties given.

Province of Rioja represented by Joaquin Gonzalez, Gustavo Wurffbain, the Provincial Commission, and Martin Gelos, show 140 specimens of drugs.

Province of Buenos Ayres, represented by Justice of Peace of Ensenada, E. & C. Valdes, Juan Gonzalez, Dalmiro Iñiguez, the Provincial Commission, Tomas Oliden, and Manuel Gache, show 65 specimens of drugs.

Province of Corrientes, represented by Vicente Ferrer, show 75 specimens.

Enrique Roibon shows 141 specimens.

Sub-commission of Bella Vista show 225 specimens of drugs. No medicinal properties assigned.

Province of Salta. The Provincial Commission and John Sola show 34 specimens of drugs.

Province of Cordoba. The Provincial Commission show 32 specimens of drugs.

Province of Entre Rios. Vicente Martinez Fontes. Cardo santo; tonic and sudorific. Culantrillo de pozo—Adianthum capillus veneris. Carqueja; efficacious for muscular rheumatism. Llanten; astringent, used as a lotion and for gargles. Oreja de gato; taken as tea for indigestions. Escoba dura; for the same. Verbena silvestre; astringent. Mercurial, annua. Althæa officinalis; pectoral; it is also used for inflammations. Apio cimarron; diuretic. Hojas de San Juan; this leaf is applied to boils and tumors. Yerba de pollo. Granilla blanca—Triticum repens; refreshing. Yerba de la perdiz; diuretic. Paico; remedy for cough. Yerba del zapo; remedy for headaches. Salvia officinalis; tonic. Salvia esclarea. Pago, Palo de la Cruz; active purgative; fifteen berries a dose. Tála; the branches and leaves of this plant are astringent. Abrojillo—Cepacaballo; to be taken as tea for liver complaints. Wild lavender. Altamisa; tonic. Culé; for indigestions. Yerba del cierro; diuretic. Penachillo; used for coughs, wounds, etc. Zarza blanca—Smilaceæ; purifies the blood. Zarza colorada—Smilaceæ; purifies the blood. Papa purgante—Solanaceæ; purgative. Berros, aquatic; for liver complaints. Capicati; remedy for asthma. Sanguinaria blanca; for purifying the blood. Sanguinaria colorada; for purifying the blood. Duraznillo blanco; for fevers. Lampazo; for inflammations. Ajenjo—Absinthium vulgare; tonic and stimulant. Achicaria silvestre; for coughs and other diseases. Camalote, aquatic; for phthisis; apply the leaf to the lungs. Carao.

The Paraná Commission. Piperina. Duraznillo. Zarza blanca. Raiz de Capicati; for spasms.

M. Berdie, Agua sanguinaria; composition made by the exhibitor for cleansing and purifying the blood, and for dissipating the effects of blows, providing there be no fracture.

The Paraná Commission. Two bottles of Berro water. Quino roots. Quino branches. Black sarsaparilla roots. Wild manzanilla. White sarsaparilla. Granadillo. Guaycurú.

Province of San Juan. Victor Rodriguez. Azafran—Saffron; from the Alto de la Sierra. Linseed; for poultices.

Severo Rodriguez. Mostaza—Wild mustard. Linseed. Anis.

Tiburcio Pobleti. Ajenjo; digestive. Menta. Manzanilla. Duraznillo. Tomillo; digestive. Paico; the seed is used for indigestions. Soconte. Tola; preservative against the nausea experienced at great elevations from lack of oxygen in the air. Quintacles de algarrobo; for curing blows. Malvisco; sudorific. Salvia. Poleo; digestive. Chilca dulce. Canchalagua; for purifying the blood. Poleo. Malvisco.

Province of Santiago. The Provincial Commission. Collection of medicinal herbs. Cayuchiza; for ocular diseases. Oreja de agua; for wounds. Mosquito yuyo; for wounds. Paico. Tala. Poleo. Kinipi; for diseases of the lungs. Cepacaballo. Hediondilla; remedy for inflammation of the lungs. Loconte. Urituchaquin. Sacha melon; remedy for dysentery. Ubia root. Ubia flower.

Province of Tucuman. The Provincial Commission. Alpamato; tonic. Santa Rosa; disinfectant. Tusca; for curing wounds. Ramo; for poultices. Wild mustard. Manzanilla. Arrayan. Cepacaballo; diuretic. Hediondilla; purgative and vomitive. Suelda con suelda; a hair-wash. Cardo santo; purgative. Llanten; astringent much in use in throat diseases. Yerba de la víbora; used as a poultice for venomous bites. Vira-vira; sudorific. Cebil leaves; astringent. Pito canuto; the leaves are purgative. White malva. Duraznillo; purgative. Flor de sauco. Viraró; for curing wounds. Verbena. Quimpe; astringent. Romerillo. Algarroba blanca. Coronilla. San Antonio. Palan-palan. Laurel. Molle. Lecheron cáustico; a blister. Espinillo; tonic. Palma Christi; emollient.

CHILI.

Oil of Wood for medicinal purposes, exhibited by L. Salcedo, Bogota, Colombia.

Medicinal Herbs of Chili, exhibited by National Society of Agriculture, Santiago.

Polisone (Crinodendrum Hookerianum), exhibited by C. Anwandter, Valdivia. Palqui (Cestrum parqui). Peppermint (Mentha piperita). Holywood (Weinmannia trichosperma). Laurel (Laurelia aromatica). Blackwood (Euxenia grata). Boldo (Boldea fragrans). Paico (Ambrina ambrosivides). Pillupillu (Daphne Pillupillu).

Yerba-mora (Solanum nigra), exhibited by Dr. Martin, Ancud. Pollante (Lycopodium panniculatum). Culen (Psoralea glandulosa). Cepacaballo (Xanthum spinosum). Yerba loza (Mertenesia pedalis). Murta (Myrtus agni). Huinque (Lomatia ferruginea). Manzanilla (Matricaria chamomilla). Sanguinaria (Polygonum virgatum). Luma (Myrtus luma). Pillopillo (Daphne pillopilla). Niquin (Osmorrhiza berteru). Romesa (Rumex romhsa). Chilca (Bauharis umbelliformis). Domdom (Phytolacca australis). Ciruelillo (Embothrium). Arrayan (Eugenia spiculata). Romerillo Chilote (Baccharis patagonica). Beu (Coriaria ruscifolia). Malva (Malva arborescens). Cañan or Tusa (Misodendron macrophyllum). Vauvan (Laurelia serrata). Altamisa (Pyrethrum parthenum). Matico (Buddteia globosa). Palpalen (Cenecio cynosus). Chaquihue (Crinodendrum Hookerianum). Boldo (Boldea fragrans).

Medicinal Plants from the Department of Elqui. Salvia, for baths. Verdolaga (Portulaca oleracea). Baylahuen (Haplopappus baylahuen). Sanguinaria (Polygonum sanguinaria). Yerba del Incordio (Yerba crinoides). Contrayerba (Flaveria contrayerba). Doradilla (Polypodium). Achicoria (Chicorium intybus).

Medicinal Plants from the Department of La Ligua. Orégano (Origanum maru). Culen (Psoralea bituminosa). Chamico (Datura stramonium). Ruda (Ruta bracteosa). Malva visca (Lavatera arborea). Yerba del Incordio (Yerba crinoides). Cedron (Lippia licioides). Pinpingo (Ephedra andina). Sen (Cassia venicosa). Relbum (Galium chilensis). Paico (Ambrina ambrosiodes). Romero (Baccharis rosmarinifolia). Retamilla (Linum ramosissimum). Salvia; for baths. Yerba del lagarto (Polytriarum coriaceum). Té de burro (Eritrichium guaphalvider). Quelenquelen (Polygala quidividis).

Medicinal Plants from the Department of Victoria. Flumaria officinalis. Ephedra andina. Myoschylos oblonga. Viola odorata. Euxenia grata. Myriophyllum verticillatum. Acaena splendens. Tilio sylvestris. Acaena agentea. Asparagus officinalis. Galium chilensis. Bacharis chilea. Bacharis chilquilla. Gunnera selara. Los Loranthus. Datura stramonium. Linum aquilinum. Rosmarinum officinalis. Argylicas huidobriana. Acaena pimpinella. Proustia pimjeus. Morgyricarpus setosus. Stachys albicaulis. Flavenia Dauda. Niphobotus calaguala. Borrago officinalis. Quinchamalium. Mulinum. Aspidium pilix. Adiatum. Eritrichium guaphalvider. Tropeolus mayus. Libertia. Aristotela maqui. Lichens. Fabiana imbricata. Xantium spinosum. Rutea bracteosa. Euphorbia portulacoides. Papavera somnifera. Parlieria hygrometica. Meuta citrata. Golium chilense. Laurelia nobilis. Geune chilense. Erythræa chilensis. Scorzoneria.

DRUGS FROM SPAIN AND WEST INDIAN COLONIES.

Anise Seed, Perez, Albert & Co., Alicante, Spain.

Saffron, from various exhibitors, Ciudad Real, Spain.

Flaxseed, twenty-seven varieties of charcoal, thirty-eight of ashes, and twelve of coal dust of trees in Spanish Mountains. Shown by Federico Onis, Cantalapridra, Province of Salamanca, Spain.

Saffron, shown by three exhibitors, Province de Cuenca; three exhibitors, Province of Valencia; and two exhibitors, Province of Soria, Spain.

Spanish Opium, Edwardo Menchero, Cartagena, Province of Murcia, Spain.

Flaxseed, Antonio Ramirez, Alicante, Spain.

Canary Seed, Antonio Sirvent, Alicante, Spain.

Anise and Cummin, Joaquin Verdu Monavar, Alicante, Spain.

Anise, Hemp, Flax, and Mustard Seeds, shown by other exhibitors, Spain.

Cochineal, Honey, Wax, Olive Oils.

Chocolates, shown by numerous exhibitors, Canary Islands.

Castor-oil, Oil of Bay, shown by Celestino Dominguez, Guayama, Porto Rico, and Juan Vicente Montelova, San Juan, Spain.

Oil of Sweet Almonds, Oils of Sesame, Orange, Lemon, and Rum, shown by three exhibitors, Porto Rico.

Capsules of Poppy, Calixto Ordunas, Cascante, Province de Navarre, Spain.

Numerous exhibitors of corks and crude cork bark, dye woods, woad, sumach, madder, resinous products, turpentine, pitch, etc.

Saffron, Diego Gonzalez Conde, Mahora, Province of Albacete, Spain.

Mustard, Juan Baanante, Chantada, Province of Lugo.

Poppy Capsules, Cascante Calixto Orduno. Province of Navarre.

Chamomile, Corporation of Vinuesa, Province of Soria.

Balsam, Raphael Pelaez, Havana, Cuba.

DRUGS FROM THE PHILIPPINE ISLANDS.

Balsam Dugtungajas, Gabriel de Llamas, Province of Manila.

Philippine Drugs, Gustave Gruppe, Province of Manila.

Balsam Maria, Provincial Board, Province of Batangas.

Philippine Essences, Agustin Westernhagen, Province of Manila.

Indigo, shown by two exhibitors.

Essential Oil of Ihlang Ihlang, A. V. Westernhagen, Manila.

Triple Extract of Sampagneta, Concentrated Oil of Champacca, and of Sampagneta.

Essential Oil of Ihlang Ihlang, Oscar Reymann, Manila.

Mimosa Scandens (Goga Bayogo or Balogo), Andropogon Nardus (Raiz de Mora), Garcinia Mangostura (Cort. Mangostan), Echites Scholans (Corteza de Dita), Quinia Philippina Extract Mangostan, Jacobo Zobel, Manila.

Dita Bark, Eduardo Asuero, Tarlac.

Section of Pterocarpus, Casto Olano, Manila.

Santalinus.

Cinnamon, Allspice, etc., Government of Manila.

Sponges, Gavino Pagdangco Gumaca, Tayabas.

Honey, Wax, Tapioca, Sago, etc., General Inspector of the Mountains.

Herbarium, Collection of Barks, used in medicine, dyeing, and tanning.

MEXICAN DRUGS.

The committee would express their obligations to Don Alfonso Herrera (Professor of Pharmacy) for his courtesy in furnishing catalogues and much useful information about the Materia Medica of Mexico.

GUMS, RESINS, VEGETABLE WAX, ETC.

The Mexican Society of Natural History exhibit some indigenous gums and resins, which are largely used in medicine and in the arts. The resin known as "Coapinole" (Hymenea courbaril) is consumed by the manufacturers of varnishes, and is remarkable for its transparency and clear color, rather similar to that of amber. Large quantities of this material are collected in the State of Oaxaca, and are sold in the City of Mexico at $1 a pound. Its properties are identical to those of the India Copal. Under the general name of Copal are known in Mexico several resins produced by plants of the Elaphrium genus, and which can be used as aromatic, or for the manufacture of varnish, their colors being bright, and their prices are extremely low. The resin called "Penca Copal" is produced by the Elaphrium copalliferum. It is exceedingly abundant, and its price 20 cents per pound.

The same collection of the Society of Natural History includes the following resins:

Lechon. Produced by one Hypomanea. It is caustic, and destroys the hair. It can be the substitute of Tapsia; 500 grammes of that resin, worth 50 cents, have a 5 per cent. of active principle.

Xochicopal. Aromatic resin produced by Amyris lignaloes It is used as a fumigating perfume and for the preparation of aromatic extracts. In the City of Mexico it is worth 24 cents a pound.

Estoraque. Name given by the Indians of the southern portion of Mexico to a bark impregnated with resin from the Linaloe. They burn it to perfume their dwellings. Price, in the State of Morelos, 5 cents a pound.

Guajiote. Gum-resin from the Rhus perniciosa, used to cure the scorpion bite and for the preparation of a cement to mend porcelain and glass.

Archepin. Gum used for the same purposes.

Incense. Several resins are known by this name, and are used as fumigatory perfumes. The principal come from the Icica incienso, and from the Rosmelia floribunda.

Brea. A very useful resin, the result of the distillation of the turpentine, from the Pinus teocote which grows in the cold districts of Mexico. Brea dissolved in warm alcohol precipitates after cooling, becomes pure, and takes a white color. It is used for the preparation of illuminating gas, and in the manufacture of soap. The price of a pound is 2 cents.

Dragon Tree Blood. Astringent resin produced by the Pterocarpus drago. In the State of Guerrero is considered as a medicine against diarrhœa.

Tacamaca. Resin from the Elaphrium tomentosa. Price $1 a pound.

Mangle. Resin from the Rhisophora mangle.

Tescalama. Resin from the Ficus nymphæfolia, used in the fabrication of varnishes. Its price is 32 cents a pound.

Carana. Medicinal resin, produced from the Amyris caranna.

Chicle. Resinous product from the Achras sapota. It is used for chewing to increase the flow of saliva.

Durango Caoutchouc. New elastic gum, brought to the Society of Natural History by their member, Mr. Bartolome Ballesteros, and studied by Mr. Fernando Altimarano, of Mexico. This gum is the product of a herbaceous plant, belonging to the Synancheræ family, which vegetates in the State of Durango. Like the genuine caoutchouc it hardens with sulphur, and receives a beautiful polish. This article, when known, will be applied to a great many uses.

The India-rubber Tree, from which the caoutchouc is extracted, grows abundantly in Chiapas, Campeche, and other localities near the Gulf of Mexico. The species to which the name of "India-rubber Tree" is generally given is the Castilloa elasticæ of the Artocarpæ family, described by the botanist Vicente Cervantes. This plant produces abundantly a milky juice, which on drying is transformed into caoutchouc. The Castilloa elastica is a tree which grows to the height of from 15 to 20 metres. It can be largely propagated along the low wet shores of the Gulf of Mexico. There are in the country more than ten species of the Ficus genus, and some other plants which produce caoutchouc. The export of India-rubber in 1873 amounted to $93,052.88.

VEGETABLE WAX.

The specimens of vegetable wax exhibited by the Society of Natural History are the products of the Myrica Jalapensis, a small shrub found in the Eastern States of Mexico. The exhibit contains the seeds which produce the wax, the product in different states of purity, and some perfectly white candles made of this material. This wax is sold at very low prices in the States of Hidalgo, Puebla, and Vera Cruz.

This collection of Mexican medicinal plants, sent by the Society of Natural History, among which there are specimens of great therapeutical interest, was presented to the Society by Don Alfonso Herrera (Professor of Pharmacy), a classified list of which is given.

FERNS.

1. Polypodium lanceolatum, L. (Lengua de ciervo.) It grows profusely in the mountains surrounding the Valley of Mexico. Its twigs and leaves are used as pectorals and for healing wounds. Price, 25 cents per kil.

2. Polypodium calaguala. Schafner. (Calaguala.) Found in large quantities in "El Pedregæ de San Angel," and other places in the Valley of Mexico. The rhizomæ are used as diaphoretic and pectoral. Price, 50 cents per kil.

3. Polypodium pseudo-filix mas, Schaf. (Palmitas.) It is gathered in the mountains that surround the Valley of Mexico, and in other regions of the country with similar climate. It is used against tænia. Price, 50 cents per kil.

LYCOPODIACEÆ.

4. Lycopodium nidiformis, Fl. M. J. (Doradilla.) Grows in the same localities with those of the Polypodium pseudo filix mas. The whole plant is used in inflammatory affections of the liver. Price, 25 cents per kil.

GRAMINACEÆ.

5. Andropogon citratus, D. C. (Te limon.) Found in some warm places in the Republic. It is used as antispasmodic and as tea. Price, 50 cents per kil.

CYPERACEÆ.

6. Cyperus rotundus, L. (Peonia del pais.) Temperate regions. Stomachic properties are attributed to it. Price, 25 cents per kil.

ORCHIDACEÆ.

7. Blettia campanulata, "La llave." (Chaucle.) Temperate regions. The

decoction of this plant's pseudo-bulbs are used in dysenteries. Price, 50 cents per kil.

MELANTHACEÆ.

8. Veratrum frigidum, Schletend. (Cebadilla.) Xochimilco Mountains. The fruit and bulbs are used to kill insects. Both contain veratrin. Price, 50 cents per kil.

COMELINEÆ.

9. Comelina tuberosa, H. B. K. (Yerba del pollo.) Grows abundantly in the temperate regions. It was studied by the Mexican pharmaceutists, Gumesindo Mendoza and Alfonso Herrera. Doctors Jimenez, Aramburo, and others have confirmed the eminently hæmostatic properties of this plant. (Vid. "Gaceta Medica" de Mexico, vol. 3.) Price, 25 cents per kil.

SMILACINEÆ.

10. Smilax pseudo-china, Scheide. (Cocolmecan.) Warm regions. The roots enjoy the reputation of being diaphoretic and antisyphilitic. Price, 50 cents per kil.

DIOSCOREACEÆ.

11. Rajania subsamarata, Fl. M. I. (Cuanchalala.) Warm regions. The bark used as stringent. Price, 50 cents per kil.

CONIFERÆ.

12. Taxodium mucronatum. "Parlatore." (Ahuehuete.) Grows in the Valley of Mexico and similar places of the country. The bark is used as emmenagogue and diuretic, the leaves act topically against the itch and as resolutive. Out of the wood a liquid pitch is prepared, which is used in the treatment of several skin diseases. Price, the leaves 25 cents per kil.; the bark 50 cents per kil.

13. Pinus teocote, Scheide. (Ocote.) It abounds in the mountains that surround the Valley of Mexico and in some other localities in the country. The turpentine produced by this tree resembles that of Bordeaux. It produces 17 per cent. of essential oil. Price, 6 cents per kil.

14. Pinus religiosa, H. B. K. (Oyametl.) The turpentine produced by this tree is similar in properties to that of Venice. (Vid. "La Naturaleza," vol. 2.) Price, 50 cents per kil.

URTICACEÆ.

15. Urtica Mexicana, Fl. M. I. (Yesgos.) It grows in the temperate regions in Mexico. Its roots are used as diaphoretic. Price, 20 cents per kil.

CANNABINEÆ.

16. Cannabis Indica, L. (Mariguana.) It lives in the temperate regions. This plant is well known on account of its physiological properties. Price, 50 cents per kil.

EUPHORBIACEÆ.

17. Hura crepitans, L. (Quautlatlatzin.) A tree growing in the warm and damp regions of Mexico. Its seeds, commonly called Habillas de San Ignacio, are used as drastic. They contain 50 per cent. of fixed oil, in which are found the active properties of the grains; stearin, albuminous parenchyma, gum, and salts of lime and potash. Price, $2 per kil.

18. Euphorbia maculata, L. (Yerba de la golondrina.) It grows in the temperate regions. The juice is employed to take out the stains of the cornea, and the decoction in scabies and other skin diseases. Price, 25 cents per kil.

19. Euphorbia pulcherrima, L. (Flor de Noche Buena.) Grows in the warm and damp regions, and is cultivated in gardens. Its bracteæ are used (8 grm. a dose) to increase the secretion of milk and its decoction as resolutive. Price, $1 per kil.

20. Acalipha prunifolia, H. B. K. (Yerba del pastor.) It grows in temperate regions. The plant is used as vulnerary. Price, 25 cents per kil.

21. Croton dioicus, Cav. (Yerba del zorrillo.) It abounds in the Valley of Mexico and similar regions. The seeds contain, according to the analysis made by Mr. Donaciano Morales, vegetable albumen, gum, fixed oil, resinous matter, a brown substance soluble in water, cellulose, and salts. An emulsion made with 20 or 30 seeds acts as a drastic; the same effect is obtained with powdered root in a 2 grm. dose. Price, seeds, $1 per kil.; root, 25 cents per kil.

ARISTOLOCHIACEÆ.

22. Aristolochia grandiflora, Swart. (Guaco.) Grows in the warm and damp regions. The roots (the only part used) contain volatile oil, resin, tannin, gum, starch, salts of lime, and potash. It is applied as an antidote against the poison of serpents and of other venomous animals, and also as a diaphoretic and emmenagogue. Price, $1 per kil.

23. Aristolochia fœtida, H. B. (Yerba del indio.) It grows in Ario. The decoction of the leaves is used to consolidate wounds, and the root as a stimulant. Price, 50 cents per kil.

24. Aristolochia Mexicana, Fl. M. I. (Tla copatle.) It is found in the State of Guerrero and other warm places. It is believed that the root has antispasmodic properties. Price, $1 per kil.

THYMELACEÆ.

25. Daphnopsis solicifolia, Meis. (Hojas de San Pedro.) It grows in Cuernavaca, in a region 3200 feet above the level of the sea, according to Humboldt. The leaves are used as exutory. Price, 50 cents per kil.

LAURINEÆ.

26. Persea gratissimia, Gaeru. (Aguacates.) Aborigine of Mexico. It is cultivated in orchards. The leaves and fruit are used as emmenagogue. It is commonly believed that the fruit increases the spermatic secretion and the suppuration of wounds. The epicarpium is used as anthelmintic.

CHENOPODIACEÆ.

27. Chenopodium ambrosioides, L. (Epazote.) Aborigine of Mexico. It is cultivated in the orchards. It is used as spice and in medicine as anthelmintic and emmenagogue. Price, 25 cents per kil.

PLUMBAGINACEÆ.

28. Plumbago scandens, L. (Tlachichinolli.) It grows in the warm and damp regions of the country. The leaves exteriorly applied act as caustics and interiorly as emetics. The root is employed with the same results. Price, 50 cents per kil.

LABIATÆ.

29. Cedronella Mexicana, Bent. (Toronjil.) Grows in the temperate regions. The flowers are stimulant and antispasmodic. Price, 50 cents per kil.

VERBENACEÆ.

30. Lippia graveolens, H. B. K. (Yerba dulce.) It grows in Orizaba, Cordoba, and similar places in the eastern flowing of the great Mexican Cordillera. According to Mr. Maximino Rio de la Loza, this plant has a peculiar sacchariferous principle, which is volatile and soluble in water and alcohol, some volatile oil, and stearoptene, very similar to that from Japan, chlorophyll, woody substance, and salts. The infusion of this plant is used as pectoral and emmenagogue. Price, 50 cents per kil.

31. Lippia citriodora, Kurst. (Cedron.) It is cultivated in gardens. The infusion of the leaves is used as antispasmodic. Price, 50 cents per kil.

32. Lippia callicarpœfolia, H. B. K. (Salvia real de Puebla.) It grows in Puebla. The inflorescence and leaves are used as stimulants. Price, 50 cents per kil.

SCROPHULARIACEÆ.

33. Budleia verticillata, H. B. K. (Mispatle.) It grows in the temperate regions. The leaves are believed to be vulnerary. Price, 25 cents per kil.

34. Budleia globosa, Lam. (Salvia real de Mexico.) Grows in the temperate regions. General stimulant. Price, 37½ cents per kil.

SOLANACEÆ.

35. Nicotiana glauca, Grah. (Tabaquillo.) Abounds in the temperate regions. It is said to have the same properties as Nicotiana tabacum. Price, 25 cents per kil.

BORRAGINACEÆ.

36. Tournefortia Mexicana, Cerv. (Tlachichinoa.) Grows in the warm regions. It is employed against the itch and ulcers of the mouth. Price, 37½ cents per kil.

CONVOLVULACEÆ.

37. Ipomœa murocoides, H. B. (Palo del muerto.) Warm regions. The

decoction of the wood is used as a bath in paralytic patients. Price, 18 cents per kil.

38. Exogonium purga, Benth. (Jalapa.) It grows on the eastern side of the Mexican Cordillera. Cathartic. Price, $1.50 per kil.

BIGNONIACEÆ.

39. Crescentia alata, H. B. K. (Cuautecomate.) Grows in warm and damp regions. The fruit contains a large quantity of sugar, gum, tannin, cellulose, and salts. The fruits are considered to be eminently pectoral. Price, 12½ cents per kil.

POLEMONIACEÆ.

40. Hoitzia Cocineæ, Gavan. (Espinosilla.) Grows in temperate regions. According to Oliva, it contains resin, tannin, gallic acid, a bitter extractive, green coloring matter, sacchariferous substance, woody matter, and salts. The infusion is used as a diuretic, diaphoretic, and in a large dose, as emetic and cathartic. Price, 12 cents per kil.

ACANTACEÆ.

41. Sericographis mohintli, D. C. (Muitle.) Grows in Jalapa, and in similar regions. The leaves contain an amorphous coloring matter of a very dark blue. It resembles the sunflower, but its coloring substance is far superior to the last-mentioned flower. Price, 25 cents per kil.

GENTIANACEÆ.

42. Erythrea stricta, Scheide. (Canchalagua.) Grows in warm regions. It is a bitter tonic. Price, 50 cents per kil.

ASCLEPIADACEÆ.

43. Asclepias setosa, Bent. (Contrayerba de Julimes.) Grows in temperate regions. It is employed as a tonic and diaphoretic. Antiperiodic properties are attributed to it. Price, 50 cents per kil.

44. Asclepias linearis, L. (Romerillo.) Is profusely found in the Central Plateau. The milky juice and the leaves of this plant are used as a powerful emetico-cathartic. The seeds have a very soft hair, which can be used with the same purpose as the cider down. Price, 25 cents per kil.

APOCINACEÆ.

45. Thevetia iccotli, D. C. (Yoyote.) Is found profusely on the western side of the great Mexican Cordillera. It contains, according to Professor Herrera's analysis, fixed oil, vegetable casein, an extractive matter, a glucoside, which this professor called tevetosa, and salts. The seeds have 40 per cent. of oil; their density is 0.9100 at 20° C.; at 10° it becomes muddled, and at 0° it concretes partially. With sulphuric acid it takes a yellow color, which becomes rosy, and afterwards orange red. It is not drying, and it

seems to be composed of olein and margarin. The active principle of the Thevetia is the tevetosa. Price, seeds, 50 cents per kil.; oil, $1 per kil.

SAPOTACEÆ.

46. Sapota achras, Mill. (Chicozapote.) Grows abundantly in the warm and damp regions of the republic. The bark of this tree is used as antiperiodic. The seeds, deprived of their episperm, are used as diuretic, at a dose from 6 to 12 seeds, since in a greater quantity it is said to produce toxic effects. Around the grain there is a resinoid substance, called chicle, which is white, and easily becomes soft between the fingers. It is used to make small sculptures, and as a masticatory. Price, bark, 25 cents per kil.; seeds, 50 cents per kil.; chicle, 50 cents per kil.

47. Lucuma salicifolia, Kunth. (Zapote borracho.) Is found in warm regions. The bark is used as antiperiodic. It is believed that the fruits, the pericarpium of which is eatable, exercise a wonderful action on the brain. Price, bark, 25 cents per kil.

ERICACEÆ.

48. Arctostaphylos pungens, Kunth. (Pingüica.) Grows in temperate regions. According to Oliva, the leaves contain tannin, gallic acid, gum, chlorophyll, cellulose, a coloring matter, together with tannin, resin, and salts. The fruits and leaves are used as diuretic. Price, fruit, 25 cents per kil.; leaves, 25 cents per kil.

COMPOSITÆ.

49. Solidago montana, Fl. M. I. (Calancapatle.) Grows in the valley of Mexico. The leaves are used as vulnerary. Price, 12 cents per kil.

50. Gnaphalium canescens, D. C. (Gordolobo.) Is abundant in the Mexican Plateau. The flowers have astringent properties. Price, 25 cents per kil.

51. Artemisia Mexicana, D. C. (Estafiate.) Found in the valley of Mexico. It contains, according to Mr. L. Rio de la Loza, extractive, nitrogenous resinoid substances, both very bitter; chlorophyll, albumina, fæcula, volatile oil, and divers salts. The leaves have tonic, stimulant, emmenagogue and anthelmintic properties. Price, 12 cents per kil.

52. Athanasia amara, Cerv. (Prodigiosa.) Temperate regions. The leaves have tonic and vermifuge properties. Price, 12 cents per kil.

53. Apoplapus discoideus, D. C. (Damiana.) It grows in the valley of Mexico. The whole plant is used in baths against rheumatism. Price, 12 cents per kil.

54. Sanvitalia procumbens, D. C. (Ojo de gallo.) It grows in abundance in the Central Plateau. The decoction of the whole plant is used as a peptic. Price, 12 cents per kil.

55. Montagnæa tomentosa, D. C. (Zoapatle.) It grows in the Chapultepec Woods and other places in the valley of Mexico. According to Mr. Federico Altamirano, the leaves contain albumen, gum, chlorophyll, greasy matter, extractive, two resins, a gray, yellow, bitter, neutral substance, a peculiar

acid, soluble in water and alcohol, which gives a yellow precipitate by the action of lead and other salts. The juice and decoction of this plant provoke contractions of the womb.

56. Eupatorium collinum, D. C. (Yerba del Angel.) Guadalupe Range, north of the capital. The decoction of the leaves is commonly used in atonic diarrhœa. Price, 12 cents per kil.

57. Erigeron affine, D. C. (Peritre.) Valley of Mexico. The roots are used as sialagogue. Price, 25 cents per kil.

58. Senecio canicida, Fl. M. I. (Yerba de la Puebla.) It grows in the State of Puebla. Mr. Maximino Rio de la Loza has extracted from this plant a volatile acid, which he has called Senecio, to which he attributes the tetanic properties of the plant. It is used as antiperiodic and diaphoretic. Price, 25 cents per kil.

59. Echinacea heterophylla, Don. (Raiz del manso.) It grows in El Pedregal de San Angel (valley of Mexico). According to Mr. Cal, the root contains resin, 12.11; gummy substance, 15.62; extractive matter, 46.87; woody substance, 23.06; loss, 2.34. It is commonly used for healing wounds. The decoction is used in dysenteries, and its juice in fractures the same as dextrina.

60. Trixis pipitzahoac, Schaffner. (Pipitzahoac.) In the Valley of Mexico and in the Western mountains. The rhizomæ and roots contain a resinous substance which Mr. L. Rio de la Loza has called pipitzoic acid. It is used as drastic in a dose of from 4 to 8 grains.

VALERIANACEÆ.

61. Valeriana Mexicana, D. C. (Yerba del gato.) Grows in the Valley of Mexico. The root contains valerianic acid and not any essential oil, a resin, fecula, woody substance, and salts. It is antispasmodic. Price 25 cents per kil.

CAPRIFOLIACEÆ.

62. Sambucus Mexicana, Priestl. (Sanco.) It grows in the temperate regions of the Republic. The flowers are used as stimulants and diaphoretics. Price, 25 cents per kil.

CACTACEÆ.

63. Opuntia nopallilo, Karwin's. (Nopalillo.) Temperate regions. The common people use the decoction of the root against dysentery, diarrhœa, hæmoptysis, and metrorrhagia. Price, 12 cents per kil.

PASSIFLOREÆ.

64. Passiflora dictamus, Fl. M. I. (Dictamo real.) Warm regions. The decoction of this plant is commonly used for several diseases of the respiratory organs. Price, 50 cents per kil.

MYRTACEÆ.

65. Myrtus arragan, Kunth. (Arrayan.) Temperate regions. The leaves are used as tonics and astringents. Price, 25 cents per kil.

ROSACEÆ.

66. Cerasus capollin, D. C. (Capulin.) It is cultivated in the orchards. The bark is used as antiperiodic and in the treatment of dysentery. The leaves contain prussic acid, and are used as succedaneous of the cherry-laurel. Price, bark 50 cents per kil; leaves 25 cents per kil.

67. Cratægus Mexicana, Mocino y Lesse. (Tejocote.) It is cultivated in the orchards. The decoction of the fruits is used as pectoral; that of the roots as diuretic. Price, fruits, 6 cents per kil.; roots, 50 cents per kil.

LEGUMINOSÆ.

68. Dolichos tuberosa, Lamark. (Jicama.) Is found in warm regions. The dyeing, prepared with grains of this vegetable has powerful antipsoric properties. The tubercles are eatable. Price, seeds, 50 cents per kil.

69. Dalea citriodora, Willd. (Limoncillo.) Valley of Mexico. The whole plant is used as antispasmodic. Price, 12 cents per kil.

70. Tamarindus occidentalis, D. C. (Tamarindo.) Warm and damp regions in Mexico. The fruit is laxative. The price, 6 cents per kil.

71. Hymenea courbaril, L. (Cuapinole.) It grows in the State of Oaxaca and Guerrero. Its resin is used for varnishing. Price, $2.50 per kil.

72. Eysenhartia amorphoydes, D. C. (Palo dulce.) On the central table land. The decoction of the wood is diuretic; the maceration as prophylactic in the epizoöty of chickens. Price, 12 cents per kil.

73. Myrospermum Pereiræ, Royle. (Balsamo.) In the State of Morelos and other warm and damp places in Mexico. The fruit and bark of this tree are used to prepare a dyeing, and employed as balsamic and stimulant. Price, seeds, 18 cents; bark, 12 cents.

74. Cæsalpinia cacalaco, H. B. K. (Cascalote.) Warm and damp regions. The fruits are very rich in tannin and gallic acid; are used as astringent and to tan skins.

75. Prosopis dulcis, Kunth. (Mezquite.) Central table land and other places. The gum it produces looks very much like the Senegal and Arabian gum. They are used for the same appliances as the latter. The price according to the classes; the whitest 50 cents per kil.

76. Acacia albicans. (Huisache.) Table land. The fruits are used as astringent and as succedaneous of the gallnuts. Price, 25 cents per kil.

RIZOPHORES.

77. Rhizophoro mangle, L. (Mangle.) On the coast of the Gulf of Mexico. The gum of the tree is used as pectoral. Price, 25 cents per kil.

LITRARIEÆ.

78. Cuphea lanceolata, H. B. K. (Atlanchana.) Valley of Mexico. They use the whole plant as corroborant for women lately delivered.

79. Heimia salicifolia, Link. (Hanchinol.) In the State of Mexico. Diuretic, diaphoretic, and antisyphilitic. Price, 25 cents per kil.

TEREBINTHACEÆ.

80. Amyris lignaloe, L. (Linaloe.) Explained elsewhere.

81. Shinus molle, L. (Peru.) Explained elsewhere.

RUTACEÆ.

82. Zanthoxylum pentanome, D. C. (Palo mulato.) In the Valley of Mexico. The wood and bark are used as stimulant and tonic. Price, 25 cents per kil.

AMPELIDEÆ.

83. Cissus tiliacea, H. B. K. (Tripa de Judas.) Table land. The decoction and dyeing of the chits of this plant are used against rheumatism. Price, 25 cents per kil.

ZIGOPHYLLACEÆ.

84. Zygophyllum fabago, L. (Gobernadora.) Temperate regions. The leaves are used in bathing to cure arthritic pains. Price, 25 cents per kil.

MALVACEÆ.

85. Malva angustifolia, Cav. (Yerba del negro.) Table land. Leaves and roots are emollients. Price, leaves, 25 cents; roots, 25 cents per kil.

MAGNOLIACEÆ.

86. Magnolia Mexicana. (Mocino y Sessie.) Grows in the State of Morelos. The flowers contain essential oil, green resin, quercitrin, tannin, extractive, and salts. The infusion of the flowers is used as antispasmodic, and the tincture as tonic. Price, 50 cents per kil.

Samples of very fine Indigo were sent from the States of Yucatan, Oaxaca, and Colima, where this product is obtained in very large quantities.

Among the aromatic extracts sent from Mexico, those of Linaloe (Amyris lignaloes), Torongil (Cedronella Mexicana), and Eucalyptus globulus occupy a prominent place, prepared by Mr. Rio de la Loza.

Worthy of calling attention to are the aromatic extracts prepared by Mr. A. Morrill, and exhibited in company with those of Messrs. Rio de la Loza, in the second section of the Mexican department.

Several samples of essential oils, of balsams, and resins were also sent by the Society of Natural History, the most noticeable being that of Anicillo (Schkuhria abrotanoides), the black balsam extracted from the "Myrospermum pereixæ," a tree growing on the coasts. Among the resins, those which deserve a particular notice, as being highly perfumed, are those of Amyris lignaloes, Liquidambar styraciflua, and several species of the Elaphrium.

One of the more valuable aromatic substances in the Mexican section is the magnificent Vanilla Bean exhibited in large amount by Papantla growers

(State of Vera Cruz). This precious vegetable fruit of Mexico has already been awarded premiums in the Exhibitions of Paris and Vienna.

Cinchona, Hugo Fink, Cordova, State of Vera Cruz.

Vanilla, Jos. Bernardino, Mexico.

Peanut Oil, Dr. Bergaré, Province of Santa Fé.

Vegetable Oils, Society of Natural History, Mexico.

Olive Oil, Eduardo Canas, Mexico.

Vegetable Oils, A. Morrel, Mexico.

Olive Oil, J. Jaspeado, Mexico.

Ricino Oil, Government of Yucatan, Mexico.

Vegetable Oil, Vega de la Sayo, Mexico.

Vegetable Oil, Manuel Cordeva, Mexico.

Spanish Drugs. Poppy Capsules, Cascante Calixto Orduña, Province of Navarra, Spain.

Philippine Drugs, Gustavo Gruppe, Province of Maniba, Philippine Islands.

Balsam Maria, Provincial Board, Province of Batangas, Philippine Islands.

TURKISH DRUGS, TURKEY.

Many drugs were shown in this section, but, on account of want of system in displaying them, were usually overlooked.

What purported to be a solid block of pure resin of Scammony proved on inspection to be merely a section of a log of wood dipped into a pan of melted resin, and thereby coating the surface.

Sumach Berries, Agha Cadi Kazi, Caraman.

Aloe Wood, Avadjan Savas, Savas.

Bark of the Pomegranate Tree, Massondjon, Diarbeker.

Gallnuts, Mohammed Schet, Sparthe Koniah.

Gallnuts, Mehemed Ali Oglou, Koniah.

Sumach Leaves, Liadji Oglou Bolis, Diarbekir.

Madder, Metre Taraiche, Monastir Monastir.

Gallnuts, Prévézé Pano Mamatti, Yanina.

Gallnuts, Petro Volonia, Yanina.

Madder Root, Nicolas Djourbachi, Imbros, Dardanelles.

Madder Root, Government of Mosul, Bagdad.

Saffron, Hadji Ahmed, Tripoli.

Madder, Gallnuts, Hadji Moustapha, Aleppo.

Madder Root, Yellow Gum, etc., Government of Bigdé, Koniah.

Gallnuts, Government of Adrianople, Turkey.

Gallnuts, Government of Damascus, Turkey.

Saffron, Government of Zaferampolo, Castamouni.

Sumach Leaves, Government of Kara Issali, Adana.

Scammony and Yellow Seeds, Government of Isklip, Castamouni.

Galls, Gallnuts, etc., Government of Suliemaneeyah, Bagdad.

Gallnuts, Government of Saronkhan, Aydin.

Pine Tree Bark, Dolique Seed, Government of Smyrna, Aydin.

Gallnuts, Government of Rehmo, Crete.

Gallnuts and Yellow Seed, Effendi Artin, Adana.

Madder, Effendi Ali, Angora.

Black Pitch and Tar, Oghan Sivas, Sivas.

Pitch, Ichkodra Suleiman, Monastir.

Resin, Iovan Oglou Nicolaki, Bairamich, Dardanelles.

Manna, Maktis, Diarbekir.

Pitch, Katlani Mahmoud, Aleppo.

Opium, Andoni Konyoun Oglon, Angora.

Vegetable Gum, Cherishor Ismail, Bagdad.

Vegetable Gums, Government of Toutous, Sivas.

Scammony Resin, Della Suddas, Central Drug Store, Broussa.

Mastic, Antonio Yconomides, Canea, Crete.

Marshmallow, Effendi Mehemed Galz, Damascus.

Sweet Almonds, Marinaki Stiraki, Canea, Crete.

Pistachio Nuts, Agha Over, Malalio, Diarbekir.

Sweet Almonds, Nicoli Latzindaki, Canea, Crete.

Yellow Seeds, Yian Missa, Diarbekir.

Palma Christi Seeds, Bandjak Moustapha, Adana.

Batones, Reehu Mehemed, Diarbekir.

Yellow Seeds, Ousta Mehemed, Koniah, Koniah.

Yellow Seeds, Kangre Karabet, Castamouni.

Batones Hazelnuts, Hadji Ali Baker, Diarbekir.

Gallnuts, Government of Esiné, Dardanelles.

Sweet Almonds, Agha Chagir, Canea, Crete.

Soapwort Root, Giorki Akhati, Aleppo.

Coriander Seed, Hazron, Aleppo.

Fennel Seed, Hussein Kayod, Mardin Diarbekir.

Hemp Seed, Effendi Moustapha, Koniah.

Palma Christi Seeds, Hadji Yousouf, Diarbekir.

Anise Seed, Government of Kazikli, Aydin.

Dolique Seed, Government of Cus-Kuri, Dardanelles.

Fennel Seed and Cummin, Gaza Djbra, Aleppo.

Lucern Seed, Mehemed Ali Bin, Tripoli.

Hemp, Palma Christi, Mekineche, Melon, and Watermelon Seeds, Yousouf, Aleppo.

Yellow Wax, shown by Mehemed Haktar, Aleppo; Government of Volonia, Yanina; Government of Smyrna, Aydin; Zubei Abdourahman, Yiemen.

Sumach Berries. Abdourhman, Aleppo.

Jalap, Government of Smyrna, Aydin.

Opium, Government of Tootchana, Monastir.

Opium and Tinpigonde, Government of Saroukhan, Aydin.

Zatherè and Chinan Plants, Government of Medina, Hidjaz.

Mint and Dried Roses, Government of Mosul, Bagdad.

Poutargue, Government of Kara-Tach.

Opium, Government of Kerbella, Bagdad.

Asphodel Plant, Government of Kara Issalé, Adana.

Salep, Government of Catara, Yanina.

Poppy-heads, Carthamum Seeds and Blossoms, Government of Damascus, Syria.

Laudanum, Government of Canea, Crete.

Opium, shown by Government of Broussa; Hadji Moustapha-Marach, Aleppo; Effendi Husserin, Koniah; Malatia Tadjiché, Diarbekir; Aleppo and Pasha Tayk, Constantinople.

Poppy-heads, Manou Illias.

Salep, Oglou Starri, Castamouni.

Scammony, Ali Mourad Oglou, Dardanelles.

RUSSIAN PRODUCTS.

Guaco Plaster, Dr. Von Schmidt, St. Petersburg.

Isinglass, from the sturgeon and beluga; crab's-eyes, Nicholas Matteissen, St. Petersburg.

Isinglass; viaziga (dried tendons of the sturgeon), Alexander Schultz, Astrakan.

Isinglass, viaziga; Nicholas Sokolof, St. Petersburg.

This collection of various kinds of isinglass is undoubtedly the finest that has ever been seen in this country. Eight specimens, exhibiting the different grades, are shown. They are all devoid of a fishy odor.

Medicinal Drugs of animal and vegetable origin, Licorice Root peeled, Sumbul Root, Cantharides (selected), Insect Powder, Lycopodium, Anise Seed, Nicholas Matteissen, Moscow.

III. CHEMICALS.

CHEMICAL PRODUCTS FROM THE UNITED STATES.

Medicinal, Photographic, and for the Arts, Powers & Weightman, Philadelphia. Three hundred and twenty-eight specimens, in glass vases, bottles, and upright show cases, are inclosed in a plate-glass pavilion. Sulphate of

Morphia is displayed in blocks; Sulphate of Quinia in the form of a pyramid; whilst the Cinchonia, Cinchonidia, and Quinidia Salts are particularly noticeable; as are also Caffein in a hemispherical mass of crystals; Nitrate of Ammonia, similar in form, but larger; Citric Acid; Tartaric Acid; Blue Vitriol; Alum; Chrome Alum; Opium; Iodide and Bromide of Potassium; Rochelle Salt in crystals; Nitrate of Silver in immense crystals. The Acid Sulphates of Quinia, Quinidia, Cinchonia, and Cinchonidia are exhibited in larger quantities than were ever seen before. Taken altogether, this collection is the most imposing of any chemical group in the Exhibition, and the reputation of this well-known house is not only fully sustained, but it stands at the head of all manufacturing chemical houses who make a similar line of goods.

Medicinal Chemicals, Rosengarten & Sons, Philadelphia. Exhibit one hundred specimens of chemicals of their own manufacture. This collection includes the finer products used in medicine and in the arts. Elegant specimens of Sulphate of Quinine and other alkaloids from Cinchona Bark; Morphia Sulphate, Acetate, and Muriate; Nitrate of Silver, etc. Some of the notable samples were: Purified Acetate of Lead, Crystallized Strychnia, Monsel's Salt, Muriate of Quinia, Crystallized Nitrate of Bismuth, Sulphocarbolate of Soda. The excellent quality of the goods, together with neatness in display, were the strong points about this exhibit.

Chemicals, L. Feuchtwanger & Co., New York. A very handsome specimen of native Manganese Ore Pyrolusite, beautifully crystallized; fine specimens of Silicate of Soda, of various grades; Sulphate of Nickel; Sulphocyanide Mercury; Fluoric Acid, etc., etc.

Chemicals, Harrison Brothers & Co., Philadelphia. Sugar of Lead; Acetate of Lime; Sulphuric, Nitric, Muriatic, Acetic, and Pyroligneous Acids; a fine specimen of Alum; White Lead, dry and in oil; Colors.

White Sugar of Lead, Chloroform, Acetic Acid and Vinegar, O. S. Follett, New York. The Acetate of Lead was unquestionably the handsomest on exhibition.

Glycerin, Marx & Rawolle, New York. The makers of this Glycerin claim a chemically pure article, and state that their method of refining is by repeated distillations of the residues, obtained in the manufacture of candles and saponification of fats. It certainly has the appearance of an excellent article.

Copper Matts, Slags, etc., Pope, Cole & Co., Baltimore, Md.

Also, a beautifully crystallized specimen of Cupric Sulphate, in an arbor-shaped mass.

Zinc Ingots, Foil Castings, Oxide, Calamine, Crystallized Silicate of Zinc, and Zincite, Passaic Zinc Co., Passaic, N. J.

Refined Spelter and Tin, Matthiessen & Hegeler, La Salle, Ill.

Pyrolusite, A. Markham, Hammond, N. B.

Dolomite, Lime, and Limestone, B. Baxter, Cayuga, Ont.

Dolomite, Barclay & Morrison, Stormy Mount, Manitoba.

Nickel Ores, Joseph Wharton, Camden, N. J. A very thorough exhibit of Nickel products. Ordinary Nickel Ore, Niccoliferous Pyrrhotite from Gap Mine, Lancaster County, Pa.; Millerite, Sulphide of Nickel, pure Nickel, in cubes and grains; Chloride of Nickel; Nitrate, Sulphate, and Ammonia Sulph.; Oxide Cobalt, Ammon. Sulph. Cobalt; Cobalt and Nickel-plated wrought and cast-iron articles.

Zinc Ores, Lehigh Zinc Company, Bethlehem, Pa. An extensive collection of zinc products, particularly Oxide; this last, however, had the appearance of having been heated too highly for pharmaceutical purposes. Metallic Zinc, showing beautiful crystalline fracture; Aragonite, Calamine, Sphalerite.

Iron and Manganese, Woodstock Iron Co., Anniston, Ala. A large collection of these ores; the manganese ore not being as rich in manganese, however, as other specimens exhibited.

Glycerin, Hartmann, Laist & Co., Cincinnati, Ohio. A brilliant display of this glycerin, which lays especial claim to purity and density.

Carbonic Acid and Mineral Spring Waters, Carl H. Schultz, New York, N. Y. Shown usually in siphon bottles, this firm being probably the most extensive dispensers of aerated waters in this form in the United States.

Excelsior and Union Spring Waters, A. R. Lawrence & Co., Saratoga Springs, N. Y. This well-known Saratoga Water, showing also the method of dispensing it by the use of the air-pump, thus obtaining it just as it issues from the natural spring.

Acids, Chemical Salts, Tacony Chemical Works, Philadelphia.

Chemicals, E. B. Benjamin, New York. Twenty-four specimens Acetate Calcium, Potass. Carb., pure; Molybdic Acid, Picric Acid, Chlor. Copper, being most notable. A mammoth glass retort, and a copper still, nickel-plated, made an attractive display.

Kryolite, Alum Lye, Sodas, Acids, Calcium, and Alumina, Pennsylvania Salt Manufacturing Co., Philadelphia. The source of this company's products is the mineral Kryolite. This is brought in immense quantities from Ivigtut, Greenland, this company working the mines there, in connection with the Danish Government, each sharing equally in the product. After being transported to Philadelphia it is reshipped by rail to Natrona, Pa., where it is worked. The whole journey cannot be less than 3500 miles. Kryolite, $6NaF,Al_2F_6$, is a native fluoride of sodium and aluminium. The large lump of alum exhibited by this company is a unique affair. It weighs probably five or six tons. One of the ends has been sawed out, and this replaced by a sheet of plate glass; an opening in the top, covered with glass, admits light. The bottom of this alum cave is studded with individual crystals, capped with their characteristic octahedral summits, and from the top depends a goodly crop, similar in form, the whole forcibly reminding one of the stalactitic and stalagmitic formations common in caves.

Acids and Salts, Savage, Keyser & Stovell, Philadelphia. This firm have rather a novel way of showing their oil of vitriol. They have a series of tall glass jars, arranged on suitable shelves, which are nearly filled with oil of vitriol, and floating in each jar is a hydrometer, to observe the specific gravity and strength of the liquid.

Refined Saltpetre, Borax, Camphor, Epsom Salts, Castor Oil, H. J. Baker & Brother, New York. This firm has the most beautifully crystallized Saltpetre in the whole exhibition. Refined Borax, in crystals; Epsom Salts, very white; Camphor; and, lastly, the AA Castor Oil, which undoubtedly has the preference in this country for efficiency, a minimum degree of the disagreeable taste and odor, and brilliancy in color.

Chemical Products from Coal Tar, Silliman Chemical Works, Philadelphia. An extensive display, embracing Fresenius's Tests, Carbolic Acids, Benzole, Toluol, Xylol, Oil of Myrbane, Rosolic Acid, Picric Acid, Refined Anthracene, etc., etc.

Acids, White Lead, John T. Lewis & Bros., Philadelphia.

Coal Tar Products, Page, Kidder & Fletcher, New York. A very interesting collection, embracing seventy-four laboratory specimens arranged according to the relative position they occupy in coal tar. Many have a commercial value; others possess scientific interest only. Among the former are Benzole, Nitro-benzole (Oil of Myrbane), Anilin Oil, Phenol, Benzaldehyd (Oil of Bitter Almonds), Salicylic Acid, Methylsalicylate (Oil of Wintergreen), Phthalic Acid, Aurin, Rosanilin, Naphthalene, Anthracene, and Alizarin. L* Benzene. L Monochlorobenzene. S† Dichlorobenzene. L Nitrobenzene. S Dinitrobenzene. L Amidobenzene (Anilin). S Paranitranilin. L Cyanobenzene (Phenylcarbamine). S Azobenzene. S Phenol. L Methyl Phenate (Aniso). S Orthonitrophenol. S Trinitrophenol (Picric Acid). S Dinitroamidophenol (Picramic Acid). S Barium Isopurpurate. S Tribromophenol. S Quinone. S Hydroquinone. S Tetrachloroquinone (Chloranil). S Toluene. L Nitrotoluene, 1–2. S Nitrotoluene, 1–4. L Amidotoluene (Pseudo-toluidin), 1–2. S Amidotoluene (Toluidin), 1–4. L Cresol. L Benzylchloride. L Benzaldehyd (Oil of Bitter Almonds). S Benzoic Acid. L Methyl Benzoate. L Ethyl Benzoate. S Benzamide. L Benzonitrile. L Salicylaldehyd (Oil of Spirea). S Salicylic Acid. L Methyl Salicylate (Oil of Wintergreen). L Isoxylene. L Nitroxylene. L Xylenol. S Pthalic Acid. L Styrolene. L Mesitylene. L Pseudocumene. L Cymene. L Pyridin. L Picolin. L Collidin. L Leucolin. L Acridin. S Diphenyl. S Stilbene. S Aurin. S Leucaurin. S Rosanilin. S Rosanilin Hydrochlorate. S Leucanilin. S Naphthalene. S Naphthalene dichloride. S Mono nitronaphthalene. S Dinitronaphthalene. S Amidonaphthalene (Naphthylamine). S Naphthol. S Naphthoquinone. S Acenaphthene. S Phenanthrene. S Phenanthrenquinone. S Anthracene. S Paranthracene. S Anthraquinone. S Mono nitroanthraquinone. S Alizarin. S Pyrene. S Pyroquinone. S Chrysene. S Chrysoquinone.

Chemical Preparations, Kurlbaum & Co., Philadelphia. A good display of their specialties—Camphor, Chloroform, etc.

Acetic Acid, Acetate of Lead, Acetate of Lime, Alum, Alumina, Iron, Copper, Browning & Bros., Philadelphia.

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* L Liquid. † S Solid.

Glycerin, Stearic and Oleic Acids, Prussiate of Potash, Sulphate of Ammonia, Henry Bower, Philadelphia. An attractive exhibit of the products mentioned, the well-known and justly celebrated Glycerin occupying a prominent position; it was shown in two massive cut-glass jars. The immense cake of Yellow Prussiate of Potassa was effectively displayed, and attracted its full share of attention. Stearic acid was represented by a statue cast of the substance, representing Atlas supporting the World.

Chemical Products, by Charles Pfizer & Co., New York, are shown in quantity. Thirty-four specimens contained in glass shades with round tops, Corrosive Sublimate, Resublimed Iodine, Santonin (slightly yellow from action of the light), Iodoform, Rochelle Salt, Permanganate Potassa, Piperin, Refined Borax, Refined Camphor, Iodide and Bromide Potassium being most prominent.

Chemicals, Acids, Alkalies, Ethers, Chloroforms, Salts of Lead, Iron, etc., Billings, Clapp & Co., Boston, Mass. One hundred specimens are shown. This exhibit is flanked by four immense bottles, containing probably one hundred pounds each of prominent chemicals. The Bromide of Potassium, Chloride of Zinc, Citrate of Bismuth and Ammonia, Propylamin, Chloride of Propylamin were most noticeable.

Chemicals, Quinia, Morphia, Strychnia, Iodides, Bromides, Acids, etc., Charles T. White & Co., New York. This firm has the most tasteful display of chemicals in the Exhibition. Whilst the quantities of the goods exhibited are not large they are well selected, and the effective character of the background improves their appearance wonderfully. The Valerianate of Quinia was particularly beautiful, and the general quality of all the articles excellent.

Salicylic Acid and its Preparations, United States Salicylic Acid Works, New York.

CHEMICAL PRODUCTS FROM GREAT BRITAIN.

Soda Ash, Sulphur, Soda Crystals, John Hutchinson & Co., Widnes, Lancashire, England. The Soda Ash, ordinary and refined, Caustic and Carbonated Bicarbonate of Soda, Salt Cake, Bleaching Powder, the Sulphur recovered from vat waste.

Soda Ash, Sample of Brine from which the Soda Ash is produced, Sample of Sulphate of Ammonia employed in manufacture of Soda Ash, Sample of Soda Ash, Sample of Bicarbonate of Soda prepared by Richards's Patent, Richards, Kearne & Gasquoine, Malkins Bank Alkali Works, Sandbach, Cheshire.

Carbonated Soda Ash and Refined Alkali of unusually high tests; Carbonated Soda Ash, Refined Alkali, and Caustic Soda, of the ordinary tests; Bleaching Powder, Soda Crystals, Bicarbonate of Soda, and Chloride of Calcium. Gaskell, Deacon & Co., Widnes, Lancashire.

Bicarbonate of Soda and Pure Alkali, Bruner, Mond & Co., Northwich, Cheshire.

Caustic Soda, Black Ash, or Ball Soda, De Soto Alkali Company, Widnes, Lancashire.

Bleaching Powder, Soda Ash, Crystals of Soda, Caustic Soda, and Refined Resin, Runcorn Soap and Alkali Company, Liverpool.

Soda Ash, 60 per cent. Cream Caustic Soda, and 60 per cent. and 70 per cent. White Caustic Soda, Bleaching Powder, Soda Crystals, and Bicarbonate of Soap, Muspratt Bros. & Huntley, Liverpool.

Soda Ash (Caustic and Carbonated), 60 per cent. Cream Caustic Soda and 60 per cent. and 70 per cent. White Caustic Soda, Bleaching Powder, Chlorate of Potash, Salt Cake, and Brimstone, James Muspratt & Sons, Liverpool.

Bicarbonate of Soda, Chance Bros., Alkali Works near Birmingham.

Crystallized Alum, a new alumino-ferric compound for papermaking and precipitating sewage, Peter Spence, Manchester, England.

Soda Ash, Alkali, refined and unrefined, Bleaching Powder, Crystals of Soda (Sal Soda), Bicarbonate of Soda, Caustic Soda, Chloride of Calcium, New Castle Chemical Works (limited), late C. Allhusen & Son, New Castle on Tyne.

Bichromate of Potash, John & James White, Shawfield Works, Glasgow, Scotland.

Caustic Soda, Liverpool Alkali Works (limited), Liverpool.

Illustrations of manufacture of Carbonate of Soda, Chlorate of Potash, and products from Petroleum. James Kelly Young, Wemyss Bay, N. B.

Pure Caustic Soda, Pure Chlorate Potash, Chloride Calcium, Concentrated Sal Soda, Soapmaker or Concentrated Lye for family soap-making, Washing Powder. The most beautiful crystals of Chlorate of Potassa. These are iridescent, flashing from the surface various rainbow colors. This optical effect is rare, but can be accounted for by the decomposition of the rays of light due to the presence of a double surface to the crystal. Greenbank Alkali Works, St. Helen's, Lancashire.

Carbonate and Calcined Magnesia in blocks, bottles, tins, and boxes, T. Jennings, Brookfield Chemical Works, Cork, Ireland.

Carbolic and Cresylic Acids and Derivatives, Carbolic Acid Soaps, F. C. Calvert & Co., Manchester, England. In great variety, also beautifully crystallized specimens of Picric Acid and the Sulphocarbolates.

Fluid Magnesia, containing double the strength of the British Pharmacopœia, also Effervescing Fluid Citrate of Magnesia of the same strength, and contained in a duplex bottle. Kinmond & Co., Kenilworth Street, Leamington, England.

Rare Chemicals. Creasote from Wood, Pepsin, Aloin, Crystallized Aconitia, beautiful specimens of Chrysophanic and Phosphoric Acids, T. Morson & Son, Southampton Road, London.

Manufacture of Chlorine, Walter Weldon, Abbey Lodge, Merton, Surrey, S. W. Samples, and models of apparatus illustrative of the Weldon Process for the manufacture of chlorine.

Rare Chemicals, T. & H. Smith & Co., Edinburgh, Scotland. The rarest and finest collection of chemical products in this department. The principal proximate constituents of Opium, Codeia, Sulphate of Codeia, Cryptopia (this firm discovered this alkaloid), Muriate of Cryptopia, Narcotin, Morphia and its salts, Meconin, Narceina, Papaverina, Meconic Acid, Rhoeagenina. The Bolactic Acid (also one of their discoveries), Apomorphia in crystals, Conhydrin, and the resins of Jalap and Scammony, so highly purified that they are colorless. One hundred and thirty-eight ounces of Muriate of Thebaia said to be the product of five thousand pounds of Opium.

Chemical Products from India.

FORBES WATSON, INDIA.

Saltpetre.—This salt (nitrate of potassium), called *Shorah*, occurs in many parts of India as an incrustation on the soil, and mixed with it to some depth, though not lower than the air can penetrate. The soils producing it must be rich in alkaline, or alkaline earthy bases, to fix the nitric acid, formed by the oxidation of organic (especially animal) matter, as soon as formed. It also effloresces on old mud walls, cow-house walls, and about ruins and old villages. Nearly the whole of the exports of saltpetre are from Bengal. To prepare the saltpetre the nitrated earth is boiled with water, filtered, concentrated by the heat of the sun, and afterwards evaporated with artificial heat. In some parts of the Punjab the earth is packed in coarse vessels with a small aperture at the bottom, a layer of straw is placed at the bottom to act as a filter, then a layer of wood ashes, and finally the nitrated earth, water is then percolated through, and the extract evaporated. This treatment with wood ashes, which converts other nitrates, especially nitrate of calcium, into the potassium salt, is not carried out in Bengal, where the soil already contains much potash. Saltpetre is prepared in many places for local uses only, *e. g.*, the manufacture of gunpowder, fireworks, and frigorific mixtures.

Thirteen different samples of Saltpetre or Nitre from Bengal, Bombay, Punjab, Central India, Ellore, Nellore, Cawnpore, Madras, and other places, and Saltpetre or Nitre purified at Calcutta.

Alum—This salt is manufactured to a large extent at Mhurr in Cutch; the works are said to have been carried on for the last four or five centuries. The material used is a dark pyritous shale, which is exposed for four months in heaps, and sprinkled with water. The efflorescence, called "seed of alum," is boiled with nitre, or with an alkaline salt made by burning the village refuse, treating the ash with water, filtering and boiling down. Alum is also made from a black shale at Kalabagh on the Indus, and at Kutki in the Chicalli Range beyond the Indus. A native sulphate of aluminium, arising from the oxidation of pyrites in aluminous shales, occurs in the mountains of Kumaon and in Nepal. It is called *Salajit*, and wonderful medicinal virtues are attributed to it; in the plains it often sells for its weight in silver.

Alum from Madras bazaar, Lahore bazaar, Punjab, and Bengal.

Impure Carbonate of Soda, Dhobies' earth or sajji mutti, occurs as an efflorescence in almost every district in India. It is used in the manufacture of native soap and glass.

Crude Carbonate of Soda, from Sind and Calcutta.

Anhydrous Sulphate of Iron. Salt Range. Occurs in large masses in the ground.

Borax, sohaga or tincal, is obtained in considerable quantities in Puga Valley, Ladakh, and from lakes in Thibet. It is collected on the edges of the lakes, and transported across the Himalayas on sheep and goats, and refined at Umritzur and Lahore.

Borax in native crystals, Thibet. Borax, Thibet.

Sal Ammoniac. (Naushadar.) Kurnal. Punjab.

Sal Ammoniac (Chloride of Ammonium) has been manufactured for ages by the potters of the Kaithal and Gula tahsils of the Kurnal District. To obtain it, from 15,000 to 20,000 bricks of a dirty clay or mire found at the bottom of ponds are placed round the outside of each brick-kiln; when about half burnt the raw substance from which Naushadar is made exudes, and adheres to the exterior of the bricks. This is purified by solution, crystallization, and subsequent sublimation in large closed vessels of thin black-colored glasses. In Oude it is manufactured from the contents of cesspools.

Sal Ammoniac. Calcutta.

Sulphate of Copper. Blue Vitriol. Calcutta. Used medicinally, and in making astringent tooth powders.

CHEMICAL PRODUCTS FROM THE BRITISH COLONIES.

Aerated Waters, Barrett & Co., Sydney, New South Wales.

Bisulphate of Lime, Charles Grant, Jamaica.

Bismuth, W. Hammond, Hobart Town, Tasmania.

Salt, Nitre Cake, Nitric, Muriatic, Sulphuric Acids, Sodium Nitrate, A. Cowan, Brockville, Ontario, Canada.

CEYLON CHEMICALS.

A fine specimen of Plumbago, also an Elephant carved in Plumbago, on an ebony stand (by a Singhalese), Armitage Bros., Colombo, Ceylon.

CHEMICAL PRODUCTS FROM FRANCE.

Cream of Tartar, Jean Fournier, Roanne Loire, France.

Anilin Colors, A. Pourrier, Paris, France. The richest and most tastefully arranged collection of anilin dyes in the Exhibition.

Refined Sulphur, Boude & Son, Marseilles.

Chemical Preparations, Charles Dubois, Marseilles.

Bone Phosphates, Jacquard, Father & Son, Lyons.

Carbonate of Soda, Rubaton & Co., Marseilles.

Chemical Products, Solvay & Co., Varangeville.

CHEMICAL PRODUCTS FROM GERMANY.

Rock Salts, Salts of Potassium, etc., Royal Salt Works, Stassfurt.

Chloride of Potassium, etc., Chemical Factory, Stassfurt.

Sulphate of Potash, Glauber Salts, etc., Chemical Factory, Leopoldshall.

Chloride of Potassium, Chemical Factory of Nett, Faulwasser & Co., Leopoldshall.

Artificial Salts of Chloride of Potassium, Zimmer & Co., Stassfurt.

Chloride of Potassium, G. Lindemann & Co., Stassfurt.

Medical Salts, etc., B. W. B. Douglas, Westeregeln.

Pine Oil, C. & L. Lairitz, Remda.

Chemicals, Vorster & Grüneberg, Kalk near Cologne, Germany.

1. Sulphate of Ammonia. 2. Sulphate of Potash. 3. Carbonate of Potash for soapmakers. 4. Hydrated Carbonate of Potash for glass-manufacturers. 5. Nitrate of Potash.

Sulphate of Ammonia is produced out of the ammonia (refuse) waters of German gasworks by the well-known process of distilling this water, and conducting the evolved gas, being charged with ammonia, into sulphuric acid.

Sulphate of Potash is manufactured by decomposing chloride of potassium from the Stassfurt salt-mines, by means of oil of vitriol in the ordinary way.

Carbonate of Potash is produced by mixing the sulphate of potash with coal and limestone, and melting the mixture according to the well-known process of Leblanc; following comes the extraction and refining of the resulting potash.

The product is very pure, and soapmakers prefer it to other sorts of potash on account of its low price and far superior quality.

The manufacture of Hydrated Carbonate of Potash, free of any sulphates, is carried out by refining the carbonate of potash, 95 per cent., and is largely consumed by English, German, and Belgian flintglass manufacturers.

Nitrate of Potash is manufactured by decomposing Stassfurt chloride of potassium with nitrate of soda. The product is consumed by the gunpowder manufacturers of France, England, Switzerland, Belgium, and Germany, and is sold to them according to request, containing either one part of chloride in three thousand, or one part in ten thousand parts of saltpetre.

The Nitrate process and the Leblanc process for potash salts have been introduced into Germany by Dr. H. Grüneberg, partner of the above firm, the production of this firm amounting during the last years to upwards of 12,000 tons a year altogether, and manufactured in the different establishments at Kalk, Cologne, St. Petersburg, Hamburg, Leipzig, and Dortmund.

Chemical Works, Brohme & Co., Bergen a. d. D. Water-Glass, and Allied Products. Raw materials are: Soda, Sulphate, Charcoal, Quartz Sand. Products: Soda and Potash Glass, in solid and liquid form; the latter in different concentrations and of various compositions, according to its application to soap, paints, artificial stone, etc. Further, white barrel-soap and artificial water-glass whetstones.

Soda Works, Moritz Honigmann, Aix-la-Chapelle. Produces chiefly Calcined 98 per cent. Soda by the ammonia process. The operations are performed in large wrought-iron vessels provided with cast-iron tubes and cocks. The reaction takes place at a pressure of only one-quarter to three-quarters of an atmosphere; the decomposition of the salt to bicarbonate at about 35° C.;

the redemption of the ammonia from lime and sal ammoniac, at 100° C. as raw product; they use for the decomposition of the sal ammoniac unslacked lime, which, with simultaneous consumption of the carbonic acid, they obtain by burning mountain limestone with coke. The salt is obtained from the saltpetre works. The residues of calcium chloride have, as yet, not found an application. The calcined soda produced contains, on the average, 98 to 99 per cent. carbonate, is free from iron, sulphur, and sulphuric acid, and is hence employed more particularly in dye and glass works. The bicarbonate is as yet only slightly dried; it is distinguished by its mild taste, it being entirely free from the monocarbonate. The daily production of the works is 6600 lbs. calcined soda.

Chemical Works, Kunheim & Co., Berlin. The most important articles made by this house are Sulphuric Acid, Potashes, Potassium Chlorate, Ammonia preparations, Oxalic Acid, Naphthalin products, Chlorate of Potash, Refined Potashes, Oxalic Acid, Oxide of Cobalt, Oxide of Copper, Acid Oxalate of Potash, Naphthalin Yellow, Phthalic Acid, Carbonate of Copper, Carbonate of Ammonia, Tungstate of Soda.

Oxalic Acid Works, Rudolph Koepp & Co , Oestrich in Rheingau. Produces Oxalic Acid from sawdust, it is then treated with caustic alkali, and subsequently the Acid Oxalate of Potash is extracted. The Oxalic Acid is used almost entirely in dyeing; further, in the manufacture of corallin and several anilin colors, while the Acid Oxalate of Potash finds application in the straw laundries and bleaching works. The yearly production is about 880,000 to 990,000 lbs. of Oxalic Acid. Exhibited are Oxalic Acid and Acid Oxalate of Potash.

Manufactory of Vanillin, established 1875, Dr. Wilhelm Haarmann, Holzminden on the Weser. For the production of the so-called "Artificial Vanilla" the sap (Cambial-juice) found between the bark and the wood of the Coniferæ is used, which yields the intermediate substance, "Coniferin," from which the Vanillin is made. Vanillin possesses the aromatic properties of vanilla, and is intended to serve as a substitute for it, as it has the advantage of affording mixtures containing exact amounts of the substance, whereas vanilla contains a very variable amount of Vanillin. The Vanillin exhibited is made from coniferin. By perfection of the process the firm has succeeded in bringing Vanillin into the market at a price which not only does not exceed that of the raw Vanillin in the vanilla beans, but is far lower than the market price of vanilla. Exhibited are: one glass of Vanillinic Acid (a side-product); two glasses of Vanillinic Sugar; two boxes of Vanillinic Sugar in glasses; one glass of Vanillinic Alcohol; one glass of Coniferin; one glass of Vanillinic Glycerin; one glass of Vanillin.

Dr. F. v. Heyden, Dresden-Neustadt. These works produce Salicylic Acid and its derivatives. For the production of the same, the best carbolic acid imported from England is employed as raw product. The process is that patented in Europe and the United States by Professor H. Kolbe, of Leipsic. The Salicylic Acid has found most extended application in medical science, and in industry as a preservative and disinfectant. The collection exhibited contains: Winter-green Oil; pure Crystallized Salicylic Acid; pure Precipitated Salicylic Acid; pure Medicinal Sodium Salicylate; crude Salicylic Acid; crude Sodium Salicylate; Sodium Phenylate.

Fridr. Jobst, Stuttgart. Fabrication of the Alkaloids and their compounds from Quinine barks and Opium, of Santonin and other chemical products for medicinal use. The quinine barks from the Dutch plantations in Java, and opium from Persia as well as some of the German opiums, are used in large amounts as the latest new raw products. The following new substances, some possessing scientific, others practical interest, have proceeded from the laboratory of Fridr. Jobst during the last ten years: Codamin, Hydrocotarnin, Lanthopin, Laudanin, Laudanosin, Meconodin, and Protopin, as new Alkaloids of Opium; Ditamin, Echicerin, Echikautschin, Echiretin, Echitein, Echitin, constituents of the Dita Bark; Paytin and an accompanying amorphous alkaloid from the China Alba of Payta; Chinoidin Citrate in lamellæ, cheap remedy for fever; Cotöin, the crystallizable constituent of the Coto Bark; Chinamin, alkaloid of the East Indian Quinine Bark; Physostigmin, active principle of the Calabar Bean; Rhoeadin and Rhoeagenin, alkaloids of the Papaver Rhoeas; Santoninic Acid from Santonin; Quinine Tetrasulphate, cryst; Quinine Salicylate, cryst.; Quinine, pure, cryst. Finally, numerous researches and articles concerning Quinine Barks from Java; China Cuprea; native Extraction of Opium; Alkaloids of the Quinine Barks, comprising Quinine, Conchinin, Cinchonidin, Cinchonin, Paricin, Quinicin, Cinchonicin; alkaloids of Opium, comprising Narcein, Narcotin, Opianin, Papaverin, Pseudomorphine, Thebaïn; and concerning Opium Wax.

The yearly production of alkaloids is about 33,000 lbs.

Among the exhibited substances are noticeable: German Opium, grown in Würtemberg, contains 12 to 10 per cent. of morphine. German Opium, from Silesia, contains 8 to 9 per cent. of morphine. Quinine, pure cryst. Quinine Anetholate. Quinine Citrate. Quinine Ferrocitrate, red. Quinine Ferrocitrate, green. Quinine Hydrochlorate. Quinine Sulphate. Quinine Sulphate, Neutral or Bisulphate. Quinine Tetrasulphate. Quinine Tannate. Quinine Valerianate. Cinchonidin, pure. Cinchonidin Hydrochlorate. Cinchonidin Sulphate. Conchinin, pure. Conchinin Sulphate. Chinoidin Citrate in lamellæ. Morphine, pure. Morphine Acetate. Morphine Hydrochlorate. Morphine Sulphate. Laudanin. Meconin. Pseudomorphine. Thebaïn. Sodium Santonate and Santonin.

Lastly, *new* preparations since 1873: Phenylquinine Hydrochlorate. Phenylquinine Sulphate. Phenylquinine Salicylate. Cotoïn. Echicerin. Cinchonicin Oxalate. Phenylcinchonidin Sulphate. Quinicin Oxalate. Santoninic Acid. Chinamin. Echitin. Echitcïn.

Manufactory of Alcohol Preparations, established 1872, C. A. F. Kahlbaum, Berlin. The most important productions of the works are: Acetic Acid, in all degrees of strength and purity. Acetic Acid Salts and Ether. Absolute Methyl, Ethyl, and Amyl Alcohols. Mustard Oil from Allyl Alcohol. Iodoform, Acetone, and Aldehyd.

With the works is connected a laboratory for the production of scientific preparations, for which many of the waste products serve as the most important starting-points. To this class belong the collective members of wood spirit, the fat alcohols from those occurring in raw spirit to those of amyl alcohol, the other acids, besides acetic, contained in the pyrolignate of lime, and many various compounds of the so-called aromatic series.

The raw products used are raw spirit, raw wood spirit, pyrolignate of lime, etc.

The works have introduced into the market a great number of substances, formerly difficult to produce. The mustard oil, which they were the first to manufacture currently in great quantities from allyl alcohol, has, on account of its cheapness and its excellent quality, shown itself to be capable of competition with the natural oil.

Acetate of Ethyl and Amyl. Absolute Ethyl Alcohol. Acetic Acid, pure and commercial. Pure Fat Alcohols. Various Acetic Acid Salts. Mustard Oil from Allyl Alcohol. A Pure Methyl Alcohol. Iodoform.

Dr. L. C. Marquart, Bonn. The works produce chemical-pharmaceutical and chemical-technical articles.

Saame & Co., Ludwigshafen on the Rhine. The works cover an area of about seventeen acres. Originally the works were used for the production of Chloral Hydrate.

After the price of chloral hydrate had sunk so that almost all manufacturers had ceased to make the article, it did not pay the Ludwigshafen Works to purchase from other manufactories the large amounts of muriatic acid necessary for the preparation of the substance. Hence, in the year 1872, sulphuric acid and muriatic acid works were established, with the intention of producing a cheaper muriatic acid as well for the manufacture of chloral hydrate as for the production of other chlorinated substances, as chloroform.

As a peculiarity of these works, it is to be remarked that a large part of the chloroform is made from chloral hydrate. This chloroform is absolutely free from other chlorine compounds, which not only allows an easier management in its therapeutic application to be attained, but renders any noxious after effects of anæsthesis impossible.

Besides Chloral Hydrate, Chloroform, Sulphur Chloride, Potassium Chlorate, and other chlorinated substances, the works at present produce also Sulphuric, Muriatic, and Nitric Acids (13,200,000 lbs. annually), and further, chemically pure Mineral Acids, Sulphuric Acid, the Acid and Basic Sulphurous Acid Salts, as well as other chemical-technological and pharmaceutical preparations.

Of the raw products, the coal comes from the Saar, the pyrites from Westphalia, the manganite from the Lahn, the salt from the Neckar Salines, and the saltpetre from the North Sea.

There are exhibited: Pure Chloroform from Chloral. Chloral Hydrate in mass. Chloral Hydrate cryst. in rhomb. Sulphur Chloride. Suphuric Acid. Sodium Phosphate. Chloral Alcoholate. Muriatic Acid. Sodium Hyposulphate. Potassium Chlorate. Nitric Acid. Sodium Bisulphate.

Chemical Works, Stock Company (formerly E. Schering), Berlin N., No. 4 Fenn Street. The most important productions are: Iodine and Potassium Bromide. Resublimed Iodine. Tannin, Gallic, and Pyrogallic Acids. Glyccrin, distilled and refined. Salicylic Acid and its Salts. Chloral Hydrate, Crotonchloral Hydrate. Carbolic Acid. Chemically Pure Acids. Potassium Cyanide. Gold and Silver Salts. Manganese Borate. Strontium and Barium Nitrates. Gold Sulphide. Collodium. Epsom Salts. Preparations containing Ammonia, Barium, Cadmium, Cobalt, Iron, Potassium, Copper, Lithium, Sodium, Nickel, Mercury, Strontium, Bismuth, Zinc, and Tin.

Exhibited: Carbolic Acid, purest (phenol. absolut.), in loose flocks. Carbolic Acid, chemically pure, crystallized. Tannin (tannic acid), lightest; soluble to a clear solution; in leaves for use in wine; in powder according to the Pharmacopœia; for technical purposes. Potassium Cyanide in sticks and lumps of various degrees of strength. Salicylic Acid, chemically pure; amorphous; crystallized; sublimed. Ammonium, Quinine, Sodium, and Zinc Salicylates. Silver Nitrate in sticks and crystals. Gold Chloride and other Gold Salts. Strontium and Barium Nitrates. Lithium Carbonate and pure Potassium Carbonate. Double Potassium Carbonate, chemically pure. Caustic Potassa, melted in sticks. Cadmium sulphide, yellow and orange. Sodium Ethylsulphate. Manganese Borate (drying powder), etc. Chloral Hydrate, accredited to Dr. Liebreich. Potassium Iodide and Bromide. Chloral Hydrate in crusts. Pyrogallic Acid, I and II. Glycerin, distilled, chemically pure. Gallic Acid, chemically pure. Potassium Permanganate. Cadmium Iodide and Bromide. Caustic Baryta, crystallized. Bismuth. Cadmium (metal). Monobromated camphor. Lead Iodide. Carlsbad Salt. Sodium Tungstate. Celloïdin. Chloral Hydrate. Collodium.

Dr. Theodor Schuchardt, Görlitz. The works produce principally substances used in the glass and clay-ware industries, dye works, and bleacheries; further in large amounts of reagents and preparations for pure scientific or analytical use.

The most important raw materials used are Chinese and Japanese galls; tungsten and molybdenite from the Erz Mountains; chromite from Portugal and Norway; cobalt and nickel ores from Hungary, Chili, and Melbourne; tin from the East Indies, Saxony, and Bohemia; boric acid from Italy; platinum from the Urals and Colombia; cerite from Sweden; pyrolusite from Spain and Thuringia; arsenic from the Saxon and Bohemian metallurgical works; copper from Sweden and North America; tellurium ores from the Seven Mountains; selenium chimney-dust from Eisleben; finally the raw acids, soda, potashes, saltpetre, iron and copper vitriol, are obtained from German manufactories.

The specialty with this house is the manufacture of rare chemical preparations for analytical and pharmaceutical purposes. A valuable collection of the elements Barium, Strontium, Plumbum, Zirconium, Chromium, Thallium, Lithium, Borium, Silicium, Indium, Sodium, etc. Also rare chemicals, Titanic Acid, Chlorate of Ruthenium, Sulphate of Didymum, etc.

H. Trommsdorff, Erfurt. In the first years of its existence the works produced chiefly alkaloids, but after enlargement there have been produced various kinds of organic and inorganic preparations for chemical laboratories, as well as for analytical and synthetic purposes; pharmaceutical preparations for apothecaries, as plasters, extracts, etc.; photographic preparations; butyle ether, formic ether, and various fruit ethers.

Exhibited are: Fifty diverse Alkaloids, crystallized, bitter principles; Glucosides, among others, Aconitin, Amygdalin, Atropin, Quinine Valerianate, Caffein, Coniïn, Piperin, and Veratrin. Thirty Organic Acids of the fat series and the aromatic group, among which are Butyric Acid and Lactic Acid. Various Salts of Formic Acid, Valerianic Acid, and Lactic Acid. Cyanogen compounds, Urea, Mellithic Acid salts. Sodium Sulphovinate, Zinc Sulphocarbolate, Iodoform, Monobromcamphor.

Physiological Preparations: Glycocoll, Allantoin, Cholesterin, Taurin, etc.

Pharmaceutical extracts: Extract Filicis eth., Extract Moncsiæ, etc.

Caustic Potassa and Soda in various forms and purities: Potassium Nitrate and Potassium Sulphocyanide. Cadmium Bromide, Cadmium Sulphide, Cadmium Sulphate. Calcium Chloride, fused, white, chemically pure. Chromic Acid, Cobalt Chloride, Cobalt Sulphate, Cerium Sulphate, and other Cerium Salts. Barium Superoxide, Iron Sulphide in thin plates, Lithium Carbonate, Lithium Vitriol, Copper Oxide, Manganese Salts, Molybdenic Acid and Ammonium Molybdenate, Nickel Chloride, Nickel Sulphate, Uranium Salts, Tungstic Acid and Tungstic Salts, Salts of Beryllium, Caesium, Didymum, Erbium, Lanthanum, Rubidium, Titanium, Vanadium, and Zirconium, etc.

Rare metals: Manganese, Molybdenum, Tellurium, Tungsten, etc.

The specialty in pharmaceutical chemicals is the Lactic Acid made by this firm. It is absolutely colorless, and contains the largest percentage of Lactic Acid obtainable.

Dr. F. Wilhelmi, Reudnitz, Leipsic, produces the artificial Almond Oil, of which he is the inventor and only manufacturer. This substance is not to be confounded with Mirbane Oil, which smells like Bitter Almond Oil, but is identical, as well in its composition as in its physical, chemical, and physiological properties, with the natural oil made from almonds, and has the great advantage over the natural oil that it is free from prussic acid, and is much cheaper.

Exhibited are: Manganese, Borate and Carbonate, Artificial Bitter Almond Oil, Benzoic Acid, Niobe Essence, Benzyle Chloride.

Bisulphide of Carbon Works, J. F. Heyl & Co., Martinickenfelde, near Berlin. The establishment is chiefly occupied in the extraction of fat-oils by means of bisulphide of carbon, their purification, and the manufacture of bisulphide of carbon salts (antiphyloxera).

The Bisulphide of Carbon is made from distilled Silician sulphur. The most important raw materials are African palm-kernels and Indian or Australian Coprah (cocoanut meat).

The palm-kernels from Lagos, Loando, Accra, etc., are imported partly at the cost of the manufacturers and partly by Hamburg or English houses, while Coprah, with the exception of their own importations from Cochin, is bought at the English market or from the large Hamburg importations.

In the manufacture of machine and spindle oils, for which the establishment has long had a high reputation, olive oil, rape-seed oil, sperm oil, and various sorts of purified fatty petroleums, are used. Castor oil and maize oil are accidental products, and in the same manner cotton-seed oil and linseed oil are not manufactured at all seasons.

The extraction by means of bisulphide of carbon on a large scale was first effected by C. O. Heyl.

The oils obtained by extraction are distinguished from those produced by pressing by the small amount of slimes which they contain ; and by this process, also, the slimes containing a large amount of protein substances remain with the seed or fruit residues, and find application as fodder, although they contain 6½ to 15 per cent. less oil than those obtained by pressing, in which the oil remains in the residues (oil cakes).

The great dryness and durability of the fodder extracted by bisulphide of carbon is well known, and obtains for it nearly the market price of the oil-cake. Corresponding to the production of oil, there are 400,000 to 600,000 pounds fodder manufactured yearly.

The laying out of an oil-extraction works requires at first the same capital as a press works, and does not pay under a production of 10,000 pounds per twenty-four hours, but is less liable to breakages and repairs than the best works on other methods. Hence the oil-extraction by the Heyl's apparatus in large quantities may be regarded as a rational advance in oil manufacture.

The application of the salts for the extermination of phylloxera and similar insects is of very recent date. For application, a 5 per cent. solution of potassium xanthate (diethyl-sulphocarbonate) is recommended, which is conveyed to the roots of the vine by means of a borer, while sprinkling the fields is found to be efficient in the prevention of grasshoppers and Colorado beetles.

Rhemsdorf Mineral Oil and Paraffin Works. In the mineral-oil works at Rehmsdorf there are annually worked up in Mineral Oil and Paraffin 6,000,000 pounds of peat tar, a part of which is made by themselves, and a part bought. About 3,000,000 pounds Mineral Oil and 1,000,000 pounds Paraffin are produced.

The so-called "German Petroleum," which among other applications is used in German lighthouses, is manufactured as a specialty. The mineral oil in a purified state is used for illumination, in a raw state for the preparation of oil-gas and lubricators. This raw oil may, to a certain extent, be considered as residue. The paraffin in the raw is sold to the match works, in the pure partly to the chandlers, some being worked up into candles at the works. Some finds application, further, as an addition to wax and stearin, in the covering of dolls' heads, and in the saturating-pans of the sugar works, etc.

For the purposes of the various establishments, the tar-boileries and finishing-houses, 300,000 tons of peat are required yearly from the bogs.

As waste products from the works may be mentioned burnt resin, sulphuric acid containing organic bases, and soda containing organic acids. The former is utilized as superphosphates by decomposition with sulphuric acid, the latter is converted into carbonate of soda, and is thus rendered again serviceable.

Exhibited are: Paraffin in blocks, and Paraffin Candles.

Saxon-Thüringian Stock Company for the Utilization of Peat, Halle on the Saale. This establishment is occupied with peat-mining and the utilization of the peat, for itself as well as for the products yielded by it, as Mineral Oil, Paraffin, Paraffin Candles, Carbolic Acid, Goudron, Asphalt, and Glauber's Salts.

Exhibited are Glass Dishes, with peat, the starting-point of the manufacture; Pyramids with Crystal and Christmas Candles; Large Paraffin Block, small Paraffin Block.

Gelatin, Fischer & Schmitt, Hôchst. Gelatin of various kinds, white and red, are exhibited. It is produced from bones by extracting it with hydrochloric acid (the remaining phosphate being utilized as manure), and from hides. Gelatin is variously applied in the Arts, Manufactures, Chemistry, and Pharmacy. The special merit claimed for this Gelatin is its elasticity, brightness, solubility, and purity.

Manufactured Chemicals, collective exhibit of the German Union of Manufacturing Chemists.

Mineral Water, Biresborn Mineral Spring Company, Biresborn.

Mineral Water, Apollinaris Company, Ahnweiler.

Friedrichshalle Water, C. Oppel & Co., Friedrichshalle.

CHEMICAL PRODUCTS FROM AUSTRIA, HUNGARY.

Ceresin (Artificial Wax), and articles of Ceresin, viz., Candles, Wreath Tapers, Christmas Lights, Thread Wax, Cobbler's Wax, Floor Wax, I. R. Chartered First Austrian Ceresin Manufactory, H. Ujhely & Co., Stockerau, near Vienna, and Venice Credit Bank Manufactory of Ceresin, system Ujhely, at Treviso. Warehouses in Vienna and Trieste.

Hunyadi Janos Water, Saxlehner Andreas, Budapest, Austria.

Stearin, Paraffin, Artificial Wax (Purified Ozokerite), Candles manufactured from the same, Glycerin, Olein, Soaps of the same, Glycerin Toilet Articles, Printers' Rolling Mass, Artificial Butter of Oleo-margarin, Sarg Charles & J. M. Miller & Co., I. R. Chartered Milly Candles, Soap, and Glycerin, Vienna.

Mineral Water, Mineral Water Direction, Pullna.

Mineral Wax (Ozokerite), Refined, white and yellow, soft and hard; Wax Candles and Wreath Tapers of Bleached Mineral Wax; Bleached Carnauba Wax for tempering other candle substances. Gustavus Wagemann, Vienna Refined mineral wax is possessed of the same essential qualities as beeswax. Its point of fusion is between 70 and 75 degrees Celsius. It will melt up, in any proportion, with Paraffin, Stearin, Beeswax, and Vegetable Wax; and under proper treatment it is qualified for all kinds of articles of Wax, viz., Candles, Tapers, etc.

Mineral Water from the Ofen Rakoczy Spring, Loser Brothers, Budapest.

Crude and Melted Ozokerite, Paul Dobel, Boryslau.

Chemists' Fixtures, Carl Franke, Prague.

CHEMICAL PRODUCTS FROM SWITZERLAND.

Chemical products, A. Guyot Lupold, Neuchâtel.

Raw materials for the manufacture of Dyes, etc., Bindschedler & Busch, Basle. Splendid display of Anilin Colors, Safranin, Toluidin, Eosin in well-defined crystals, Resorcin, Methyl-rose-anilin, etc.

Naphthalin, Resorcin, Fluorescene, etc., seventeen specimens of anilin dyes, Acide phthalique anhydrous, in long opaque crystals, Durand & Huguenin, Basle.

CHEMICAL PRODUCTS OF BELGIUM.

Refined Sulphur, M. & J. Meeus, Antwerp.

Beautiful Specimens of Starch, E. Remy & Co., Louvain, Brabant.

Chemicals, Soda Products by Solvay's process, Carbonate of Soda, Bicarbonate of Soda, Calcium, Ammonique Brute, Solvay & Co., Couillet near Charleroi.

CHEMICAL PRODUCTS FROM DENMARK.

Bicarbonate and Carbonate of Soda, Aalborg Chemical Works, Aalborg.

CHEMICAL PRODUCTS FROM NORWAY AND SWEDEN.

Calcined Glauber Salts, Calcined Soda, Hydrochloric Acid, B. Bengtsson, Astra Torp, Trelleborg, Sweden.

Chemicals, A. W. Friestedt, Stockholm.

Pure acids obtained by double distillation, Eurenieus & Svalander, Stockholm.

Sulphuric Acid, Superphosphates, Soda manufactured from the residue of Sulphate of Soda, Gullberg Stock Company, Göteborg, Sweden.

Olein, Glycerin, and Stearin, Liljeholmen Stearin Manufacturing Stock Company, Stockholm.

Sulphate of Ammonia, Raw and Refined, Bergen Gas Works, Bergen, Norway.

Mineral Waters, Chr. Lud. Berg, Eriksberg, Stockholm.

Mineral Water, Mineral Water Stock Company, Stockholm.

CHEMICAL PRODUCTS FROM ITALY.

Terra Aluminefera, Terra Piombina, Terra Biancheto, Crystal Sulphur, Crystal Sulphur from Sofitano, Mannite, Terra Giallia, Rosso Dipozzuli, Cream Tartar, Cream Tartar from Myrtle, Mannite from Leaves, Sulphide of Arsenic, Terra Sofitaro, Professor de Luca, Naples.

Effervescing Phosphate Soda, Effervescing Sulphate Magnesia, Mannite, Gallato de Chinina, Sulpho Borato Acido de Chinina, Bisulphato di Chinina, Phospbato di Soda (granular), Citro Tartrato di Soda (granular), Gelatino de Olio, Ferrato de Chinina, A. Pagliaro, Messina.

Colalli Water, Birindelli, Florence.

Mineral Water, Count Aristidi, Castrocaro.

Chemicals, Candiani & Biffi, Milan. One hundred and twenty specimens of acids and chemicals in long vials, arranged in a folding case, fifty of them consisting of liquid acids, etc., and seventy crystalline salts and powders.

Sulphur, exhibited by Gaetano Romano, Palermo; Scavo Vita Brothers, Catania; Edoardo Dily, Catania; Francesco Ardizzoni, Catania; Penninir Baron of Florisballo, Catania; Cesna Sulphur Company, Cesna. The Sulphur is disseminated in a rock of limestone mixed with gypsum, which contains from 15 to 18 per cent. of it. It is extracted by smelting the mineral in large circular kilns uncovered, where the mineral is set on fire, and the heat thus evolved smelts the sulphur. In this way Black Sulphur is produced, which contains about 3 per cent. of extraneous matter. The Black Sulphur is refined by sublimation in closed cast-iron appareils, and condensation of the sulphur vapors. The refined sulphur is absolutely pure. Objects exhibited: Sulphur, Black and Refined, in loaves. Special merit claimed: Production of Black Sulphur in a comparative state of purity, containing only about 3 per cent. of extraneous matter. Production of Refined Sulphur in a state of absolute purity, fit for any pharmaceutical or other purposes.

Bicarbonate of Potassium and Sodium, Baldassare Baroncelli, Cinciano Sienna.

Cream of Tartar, exhibited by Luigi Borelli, Asti Alexandri; Guiseppi Reimandi, Acqui Alexandria (also Tartaric Acid); Grassini Gentili, Padua; Francesco Emmanuele, Catania; Domenico Fonzo, Catania; Francisco di Mauro, Catania; Guiseppi Scuderi, Catania.

Fossil Flour, Bart. Dott Cesare, Sienna.

Iron and Manganese, Ponsard & Gigli, Florence.

CHEMICAL PRODUCTS FROM BRAZIL.

Alum, M. de La Ribas.

Saltpetre, F. J. Lope, Almeida.

Sulphur from Quartz, J. C. Muricy, Silva.

Sulphide of Lead, D. Leao, Agostinho.

Sulphur Water, D. Maciel, Ferreira.

CHEMICAL PRODUCTS FROM THE ARGENTINE REPUBLIC.

Mineral Waters, F. D. Aguilar, Province of San Juan.

Glycerin, Inocencio Cardalda, Buenos Ayres.

Mineral Waters, Provincial Commission, Province of Catamarca.

CHEMICAL PRODUCTS OF MEXICO.

Sulphur from the Volcano of Popocatepetl, Sanchez Gaspen, Ochva, Mexico, Mexico.

The organic compounds extracted from the plant called "Trixis Pipitzahoac," viz., the Pipitzahoic Acid and the Pipitzahuina, are interesting, not only because of their novelty but of their prospects of future usefulness. The former ought to be considered as one of the most beautiful vegetable products. It is of a brilliant, golden color, and of a soft, silky texture, being obtained either in an amorphous state, or crystallized in small prisms and laminæ. At present Pipitzahoic Acid is employed in medicine as a drastic purgative, and it can be used as a coloring matter. Its price in Mexico is 11 cents a gramme.

Pipitzahuina is of a white color. It is fusible and volatile at over 100° C. Crystallizes in prismatic needles when treated by sublimation, and its crystals assume the laminar form when obtained by evaporation. It is insoluble in water, soluble in ether and chloroform. The two new substances alluded to were discovered, first by Prof. Don Leopoldo Rio de la Loza, and the second by D. Severiano Perez, both Mexican chemists.

Worthy of mentioning is the substance designated by Prof. Alfonso Herrera with the name of Tebetosa. It is a substance belonging to the class of the Glucosidæ. Crystallizes in four-sided prisms; is inodorons and exceedingly sour, being insoluble in water and the sulphide of carbon, but soluble in alcohol. The "Tebetosa" is extracted from the seeds of the Thevetia iccolli, which plant belongs to the Apocinaceæ family.

Salts of Sodium.—The extraction and preparation of Salts of Sodinm is in Mexico an interesting industry. These salts are present in the waters and earths of several lakes and localities of the country, being very abundant in the lakes of the Valley of Mexico. Near to these lakes there are factories in which these products are extracted, the most extensive being that belonging to Mr. Guillermo Hay, who has sent to the Exhibition several specimens of Carbonate, Sulphate of Soda, and of Chloride of Sodium. Some other manufacturers of chemical products in the neighborhood of Mexico sent samples of Salts of Sodium, among which those prepared by Messrs. Maximino y Manuel Rio de la Loza may be mentioned. But the States of Yucatan, Campeche, and Colima ought not to be overlooked, as they produce immense quantities of this kind of products.

CHEMICAL PRODUCTS OF JAPAN.

The chemicals were very creditable specimens, and indicate that Caucasian customs have obtained a strong foothold upon this, heretofore, most conservative nation. They exhibit Sulphate of Zinc, Sulphate of Iron, Sulphate of Copper, Acetate of Lead, Sweet Spirit of Nitre, Oxide of Zinc, Strong Solution of Ammonia, Red Sulphide of Antimony, Carbonate of Soda, Tartar Emetic, Bromide of Ammonium, Corrosive Sublimate.

CHEMICAL PRODUCTS OF SPAIN.

Phosphate of Lime, G. De Grappin, Malparhida, Province of Caceres.

Tartar Emetic, Gabriel de la Puerta, Madrid.

Carbonate of Zinc, Anglada & Co., Pontons, Province of Barcelona.

Phosphate of Lime, Francisco Muñoz, Bello Cáceres.

Peroxide of Manganese, M. Vasquez y Lopez, Zalamea la Real, Province of Huelva.

Thermal Medicinal Waters, Corporation of Carlballino, Province of Orense.

Thermal Waters, José Gonzales Alegre, Las Caldas, Province of Oviedo.

Alkaline Sulphurous Water, Cayetano Casariego, Prelo, Province of Oviedo.

Ferruginous Water, Cayetano Casariego, Bryeres de Nava, Province of Oviedo.

Sulphurous Water, Augustin de Cortines, Puentsnausa, Province of Santander.

Mineral Sulphurous Water, Revuelta Calderon, Alceda, Province of Santander.

Mineral Water, shown by Ana Mico, widow of Ferrandis, Jabiva, Province of Valencia, and by José Gutrerrez de Ceballos, Province of Santander.

Crystal Carbolic Acid, Chromic Acid, Arsenite of Iron, Valerianate of Bismuth, Picrate of Iron, etc., José Villar, Salamanca.

Acidulous and Carbonic Waters with Iron, Corporation of Marmolejo, Province of Jaen.

Mineral Waters, shown by Rodriguez Cayetano Gutrerrez, Mogrovejo, Province of Leon; Dominga Borregan del Blanco, Mogrovejo, Province of Leon; and by Bathing Establishment, Ponferrada, Province of Leon.

Mineral and Medicinal Waters, José Garcia Damian, San Adrian, de Vegaquemada, Province of Leon.

Mineral Waters, Corporation of Navajun, Province of Logroño.

Sulphurous Waters, shown by Diez Bros., Grávalos, Province of Logroño; Dositeo Goyaso Niera, Lugo; Ramon Pardo Montero, Traspargo, Lugo.

Ferruginous Waters, Antonio Losada Lopez, Incio, Province of Lugo.

Mineral Waters, shown by Benevolent Societies of various towns: Corporation of Mollina, Province of Malaga; Corporation of Carratraca, Province of Malaga; Corporation of Periano, Province of Malaga; Corporation of Verin, Province of Orense, Spain.

Sulphur, George Riekeny Gerdes, Mina, Bronteriza, Huelva.

Peroxide of Manganese, Emilio de Solo, Alosno, Province of Huelva.

Crystallized Manganese, Ore and Pyrolusite, Brito & Sierra, Camañas, Province of Ternel.

Calamine, Francisco Perez, Linares, Province of Vizcaya.

Medicinal Mineral Water, Corporation of Santa Ella, Province of Córdoba.

Mineral Water, Jose Maria Lopez, Lucena, Province of Córdoba.

Sulphurous Water of Arenosillo, Corporation of Montoro, Province of Córdoba.

Mineral Water, Manuel Marin, Villaharta, Province of Córdoba.

Carbonic Water, Francisca Perafita Gavigola, Gerona.

Ferruginous and Sulphurous Water, Medinacelia, Duke of, Gerona.

Ferruginous Carbonic Water, Gabriel Garcia, Gerona.

Carbonic Water, José Vilaret, Gerona.

Ferruginous and Sulphurous Water, Count of Darnius, Gerona.

Ashes of Cachi Yuyo for the production of Carbonate of Soda, Samuel A. Lafone, Catamarca.

Carbonate of Lead, Calamine, Francisco Padilla, Almeria.

Cream of Tartar and Tartar Crystal, Bartolmé Pons, Sans, Province of Barcelona.

Sulphate of Copper, Chloride of Tin, Sulphuric and Nitric Acids, G. Boada and Gracia Travessa, Province of Barcelona.

Calcined Bone, Provincial Commission, Burgos.

Cream of Tartar, Francisco Cisneros Regis, Burgos.

Inalterable Carbonate of Iron, Angel Maria Arteche, Azofra, Province of Logroño.

Chromic Acid, Arseniate of Iron, Ignacio Santiago Fuentes, Salamanca.

Hyposulphate of Soda, etc., Vinet, Troviño & Co., Seville.

Phosphate of Lime, Nitrate of Soda, Augustin Eyries, Valladolid.

Alcohol, etc., Francisco Aviles y Merin, Córdoba.

Ether, Francisco Garcia Martinez, Santiago de Compostela.

CHEMICAL PRODUCTS OF CUBA.

Phosphorus, Antonio Maria Artiz, Havana, Cuba.

Samples of Asphaltum, Francisco Fernandez, Havana, Cuba.

Phosphorus, Arteaga & Jauregin, Havana, Cuba.

CHEMICAL PRODUCTS OF PORTUGAL.

Delegny Bros., Lisbon, Portugal.

CHEMICAL PRODUCTS OF TURKEY.

Sulphide of Antimony, Djorbaji, Chio, Dardanelles.

Alum, Government of Kara-Hissar, Sivas.

Nitre, Government of Tous-Tous, Sivas.

Nitre, Government of Van, Erzeroum.

Crude Potash, Hadji Seit, Koniah.

CHEMICAL PRODUCTS OF RUSSIA.

Ferrocyanide of Potassium, A. Korolef, Vologda, Russia.

Chemicals, Nicolas Lepeshkin, Moscow.

Yellow Prussiate of Potash, A. Korolef, Vologda.

Chemical products: Crystallized Carbonate of Soda; Muriatic and Acetic Aids; Sulphuric Acid; Aqua Fortis; Refined and Chromic Alum; Sulphate of Copper and Iron; Chloride of Manganese; Tinsalt; Corrosive Sublimate; and Liquid Ammonia. Lepeshkin's chemical works, one at Moscow, and the second at Ivanov-Voznecensk, were founded in 1824, and prepare yearly different chemical products to the sum of 1½ million roubles. Nicholas Lepeshkin, Moscow.

Chemical products: Refined Alum, Sulphate of Copper, and Chromate of Potash. These chemical works were founded in 1850, and prepare yearly about 380,000 pounds of different chemical products, in value above 830,000 roubles. Peter Elaboug Ooshkof, Gov. of Viatka.

Volatile Oil and other chemical products extracted from the Marsh Rosemary (Ledum palustre). The laboratory, established in 1873, prepares yearly different chemical products to the value of 50,000 roubles, and employs 30 workmen. Alexander Poel, St. Petersburg.

Chemical products: Sulphuric, Azotic, and Muriatic Acids, Tin and Lead Salt, Red Lead, and Sulphate of Iron. Basil Kineshma, Philosofof, Gov. of Kostroma.

Chemical products: Ammonias; Soda; Caustic Potash; Nitric, Muriatic, and Sulphuric Acids; Sulphate of Iron and Copper; Chloride of Zinc; Nitrates of Lead and Copper; Refined Saltpetre and Sulphur. The chemical works are furnished with a steam machine of 12-horse power, a hundred workmen are employed, and the yearly product amounts to 85,000 pounds, value 400,000 roubles. Gregory Rasterjaef, Petersburg.

Potash, Nicholas Matteissen, Moscow.

Chemical products: Oxalic and Boracic Acids; Sulphate of Iron and Copper; Sugar of Lead; Lead Salt; Alum; Refined Soda; Oxalate, Acetate, Sulphate, Lactate, and other Salts; Hydrate of Ammonia; Chloride of Copper, and Prussiate of Potash. This chemical works was founded in 1823. The value of its yearly product amounts to 200,000 roubles. A. K. Shlippe, Gov. of Moscow, Vereja District, Plesna.

Refined Bone Oil; Theodore Bett, Cronstadt.

Samples of Bone Charcoal; Calcined Bone Powder; Bone Oil; Glue; Tallow, and other products obtained by burning bones. Calcined Bone Manufacturing Company, St. Petersburg.

Refined Oils and Drying Oils; W. Hartmann, Riga.

Soap; James and Mark Issakowitch, Odessa.

Distilled Glycerin; Krestovnikof Brothers, Kazan.

Refined Linseed and Rape Oil, Drying Oils, Oil Cake; C. Schmidt, Riga.

Oil Varnish. The oil mill was established in 1866, and the oil varnish manufactory in 1874. The value of the articles prepared amounts to 300,000 roubles yearly. The factory is furnished with a steam-engine of eighty horsepower, and forty-five workmen are employed. W. Hartmann, Riga.

Alizarin; Garancin; Flowers of Madder; Madder, Lead-white; Chromate of Potash; Green Soap; Soda Soap. Nicholas Lepeschkin, Moscow.

Transparent Glycerin Soap; different Cosmetics. The yearly product of the cosmetic works amounts to the value of 235,000 roubles, and they were founded in 1847. Thirty-six workmen are employed in the works. F. Linde, St. Petersburg.

Toilet Soap in the shape of fruits; Frederica Schmidt, St. Petersburg.

IV. PHARMACEUTICAL PREPARATIONS.

PHARMACEUTICAL PREPARATIONS FROM THE UNITED STATES.

Saccharated Pepsin; E. Scheffer, Louisville, Ky. The amount of Pepsin exhibited consisted of twelve and a half pounds of Saccharated, six and a half pounds of Concentrated, dry, and one and a half gallons of Liquid Pepsin. The especial merit of this Pepsin is that the process of manufacture always insures a uniformly reliable product. As a proof of its stability, a sample vial which had been set aside five years ago, was lately tested and found to have its original digestive strength, whilst it had not gained any bad odor by keeping. The process of manufacture was published by Prof. Scheffer, in the American Journal of Pharmacy for February, 1872. The liberality of the manufacturer, in thus publishing to the world this valuable process, has been largely taken advantage of, and it has been the means of relieving the sufferings of thousands.

Saccharated Pepsin; William Procter, Jr., & Co., Philadelphia. This Pepsin was exhibited in bulk and in ordinary trade packages, being made from reprecipitated Pepsin. The product was whiter and purer than many specimens which were on exhibition. It is made by the process of Prof. Scheffer, of Louisville, Ky.

Glycerin, etc.; W. J. M. Gordon, Cincinnati, Ohio. Glycerin in five-gallon cans, show bottles, and pound bottles. Thirty specimens of chemicals, in gallon, half-gallon, and quart bottles, including Chromic Acid, Ferric Alum, Chloride of Copper, Monobromated Camphor, Nitrate of Copper, Bromides of Potassium and Sodium, Sulpho-carbolate of Soda, Iron Scale preparations, etc., etc. Sugar-coated Pills, in gallon and half-gallon bottles; Resin of Podophyllum; Muriate of Hydrastia.

Pharmaceutical Preparations. Hance Brothers & White, Philadelphia, have a large collection of their well-known preparations, such as Fluid Extracts, Syrups, Elixirs, Lozenges, Plasters, etc. Especially noticeable is Sulphate of Berberina, Aloin, Podophyllin. The gem of the display, however, is a mass of thirty-eight pounds of Monobromated Camphor, which forms a medallion or centre-piece. The base of the exhibit is made up of a row of their drug mills.

Compressed Pills, Suppositories. John Wyeth & Brother, Philadelphia, have a very extensive collection of pharmaceutical preparations, Suppositories, Compressed Pills, and Elixirs, occupying a prominent position. The Compressed Pills are shown in greater variety than have ever been seen before. The Suppositories have been carefully made, are uniform in color, and have retained their shape admirably, notwithstanding the heat of the past summer.

Sugar-coated Pills. Bullock & Crenshaw, Philadelphia, display a well-selected stock of sugar-coated pills. It is claimed for these pills that they are not kiln-dried, are coated with sugar at a low temperature, and nothing but the best material enters into their composition.

Dietetic Articles, Henry C. Blair's Sons, Philadelphia. Wheat Food for Infants and Invalids, Saccharated Pepsin, Liquid Pepsin, Elixirs, Wines, etc., the whole making an attractive display.

Cod-liver Oil, A. W. Dodd & Co., Gloucester, Mass. A limpid, bright, light-colored oil, having the appearance of a good article.

Fluid Extracts made by pressure, cold process, David Sulzberger, Philadelphia. The points claimed by this manufacturer are the absence of air during the process of manufacturing, a larger percentage of the active principle dissolved by the menstruum, and a greater permanence of the finished Fluid Extract.

Plasters, Seabury & Johnson, New York. An extensive assortment of plasters is shown by this house, the peculiarity being that rubber is incorporated, which has the effect of rendering the plaster more pliable without interfering with its properties. All of the officinal and many unofficinal kinds are made, and the firm claim to make them of the same strength as laid down in the United States Pharmacopœia. They are all poroused, if desired, and are usually preferred this way.

Plasters, George E. Mitchell, Novelty Plaster Works, Lowell, Mass. A very large selection. Fifty-six kinds of Plasters melted and run into bottles; thirty-one yard rolls of Plasters spread on jean; Corn and Bunion Plasters in yard-wide rolls, spread on thick felt; a mammoth Plaster spread on kid, four feet in length and sixteen inches in width, together with many forms of odd-shaped Plasters, show the perfection to which this art has attained in this country. The improvements of porousing and incorporating rubber are also in use by this firm.

Fluid and Solid Extracts, Twining & Schiedt, Philadelphia. Sugar-coated Pills, Elixirs, Concentrated Preparations, Chemicals, Syrups, Tinctures, Drugs.

Powdered Drugs. Robert Shoemaker & Co., Philadelphia, have a particularly fine collection of select Powdered Drugs. They also show a full line of Fluid Extracts of good quality.

Pharmaceutical Preparations. Mackeown, Bower, Ellis & Co., Philadelphia, exhibit Fluid Extracts, Effervescing Salts, Lozenges, and Extracts (solid). The Adhesive Plaster is a prominent feature of this display, and the firm manufacture it in large quantities.

Effervescing Salts, etc., Keasbey & Mattison, Philadelphia. This firm have the largest display of Granular Effervescent Salts in the Exhibition, for which is claimed whiteness, permanence of effervescent properties, and solubility. Twenty-six varieties of Gelatin-coated Pills are shown, for which great solubility is asserted.

Fluid Extracts, R. A. Hance, Philadelphia. A collection of medicinal and unofficinal Fluid Extracts of good quality.

Preparations, Women's Medical College, Philadelphia. A complete collection of Pharmaceutical Preparations, one hundred and fifty-three in number, representing a majority of those that are officinal.

Compressed Pills, Troches, and Suppositories, Jacob Dunton & Co., Philadelphia. Suppositories contain no butter of cacao, but flour and sugar are used to make bulk when necessary. Chocolate and Santonin, Extract Carnis and Peptone Suppositories, are shown made by this process.

Pharmaceutical Products, Frederick Stearns, Detroit, Mich. The greatest variety of Pharmaceutical Preparations in the whole exhibition. Fifty-six specimens of Fluid Extracts. Twenty-eight specimens of Elixirs, the working formulas given in detail on the label. Seventy-two kinds of Sugar-coated Pills, made by building up in steam-warmed revolving pans; first, the pill itself upon a minute granule of cane-sugar, and afterward coating the same with pure cane-sugar. Powdered Drugs in great variety. Solid Extracts. Powdered Beef dried in filtered air at 140° F. Powdered Areca Nuts and Calabar Bean. Twenty specimens of Medicated Troches. Four forms of Suppositories. Three sorts of Medicated Cigars. Six sorts of Effervescing Granules, and specimens of Candied Medicines, Ointments, Medicated Candles, Cotton Dossils, Papers, Dentifrices, Resins, and Chemicals.

Sugar-coated Pills, William R. Warner & Co., Philadelphia. Exhibit the largest collection of Sugar-coated Pills. The list embraces not only officinal, but also many unofficinal varieties. Also Medicated Lozenges, officinal and unofficinal. They also exhibit their new pattern of Shop Bottles, which differ from the ordinary bottle in being elevated on an ornamental foot.

Fluid Extracts, etc., Samuel Campbell, Philadelphia. Exhibits Fluid Extracts made by his special process. Perfumery, etc.

Preparations, etc., Lewis U. Bean, Philadelphia. A general assortment of Drugs, Paints, Colors, Preparations, etc.

Pharmaceutical Preparations, Frederick Brown, Philadelphia. There are about twenty specimens of Elixirs of various kinds. Bitter Wine of Iron, Arabian Racahout, Preserved Taraxacum Juice, Essence of Jamaica Ginger, very tastefully displayed.

Gelatin Capsules, H. Planten & Son, New York. This firm exhibits Gelatin Capsules in great variety, not alone the well-known capsule filled with liquid, but empty capsules for enveloping disagreeable pills or powders. They claim to be the first to make and introduce Gelatin Capsules into the United States, the process being originally that of A. Mothes of Paris. Neither the capsules made by them nor the process is patented, but they are prepared in conformity to the general method described in the United States Dispensatory, modified somewhat where experience has suggested an improvement in rapidly making, filling, and closing them. The large sale which they have attained throughout the country, is accounted for by the firm by the intrinsic merits of the goods, no sensational advertising having been resorted to.

Cod-liver Oil, John C. Baker & Co., Philadelphia.

Castor Oil, Robert B. Brown & Co., St. Louis, Mo. This Castor Oil was very brilliant in color and of excellent quality.

Cod-liver Oil, Marvin Brothers & Bartlett, Portsmouth, N. H. Excellent quality. This oil is well known as one of the best of the American Cod-liver

Oils. It possesses but a slight odor, is light-colored, transparent, and has as little taste as any in the market.

PHARMACEUTICAL PREPARATIONS FROM GREAT BRITAIN.

Preparations, Allen & Hanburys, London. Varieties of Pâte de Jujube, and analogous articles prepared by Hawker's patent process to lessen adhesion and deterioration in appearance and consistence. Cod-liver Oil. Gelatin, impregnated with Atropia and Calabar Bean, for application to the eye.

Pharmaceutical Preparations, Alfred William Gerrard, London. Pilocarpina and Nitrate isolated from jaborandi by the exhibitor, who is also the discoverer. Suppositories and Mustard Plasters.

PHARMACEUTICAL PREPARATIONS FROM BRITISH COLONIES.

Cod-liver Oil, in three half-pint bottles, W. M. Innes, Port Chalmers, Otago, New Zealand.

Olive Oil, George L. Barnard, Adelaide, South Australia.

Olive Oil, Samuel Davenport, Adelaide, South Australia.

Pharmaceutical Preparations, Joseph Bosisto, Richmond, Melbourne, Victoria. Chemical and Pharmaceutical Preparations obtained from the Eucalyptus and other indigenous vegetation, prepared and exhibited by Joseph Bosisto, Richmond, Melbourne, President of the Pharmaceutical Society of Victoria, by whom the Eucalyptus preparations were first introduced both in Australia and in Europe. (Presented to the Philadelphia College of Pharmacy.)

Eucalyptus Vegetation.—Essential Oil, Eucalyptus globulus (Blue Gum). Tonic, stimulant, antiseptic, and anthelmintic. A small dose promotes appetite; a large one destroys it. In stronger doses of 10 to 20 minims, it first accelerates the pulse, produces pleasant general excitement (shown by irresistible desire for moving about), and a feeling of buoyancy and strength. Intoxicating in very large doses, but unlike alcohol or opium, the effects are not followed by torpor, but produce a general calmness and soothing sleep. A strong cup of coffee will at once remove any unpleasantness arising from an overdose. Anthelmintic: By enema, 30 to 60 minims in mucilage of starch. Internally: Dose, 3 to 5 minims in gum mucilage, syrup, or glycerin.

Eucalyptol, Eucalyptus globulus (Blue Gum). For inhalation in bronchial and throat affections. Obtained from the essential oil, and is a homologue of camphor. Quantity employed, from half to one teaspoonful with half a pint of hot water in the inhaler.

Eucalyptic Acid, ordinary strength; Eucalyptus globulus (Blue Gum). Eucalyptic Acid, concentrated. (Volatile, obtainable by fractional distillation; most abundant in the Red and Blue Gum species.)

Liquor Eucalypti globuli, Eucalyptus globulus (Blue Gum). Antiperiodic. The tonic or bitter principle obtained from the leaves of the tree in an amorphous condition. An ague remedy. It appears to counteract malaria without exerting the prejudicial effects of quinine on the nervous system. For ague and Dengue fever, 30 to 60 minims in half a wineglassful of mucilage and water, or glycerin and water, with the occasional addition of 2 minims of Eucalyptol every two or three hours during the paroxysms of ague. As a general tonic, 20 to 30 minims three times a day. Incompatibles. The Mineral Salts.

Tinct. Eucalypti globuli. Stimulant, tonic, antiperiodic, and antiseptic. Dose, 20 to 30 minims.

Pulv. Eucalyptus globulus folia. Antiseptic, Cataplasma.

Cigarettes, Eucalyptus globulus (Blue Gum). Disinfectant; employed in bronchial and asthmatic affections.

Essential Oil, Eucalyptus amygdalina odorata (Peppermint Gum). Rubefacient and disinfectant. This oil is generally known as the "Eucalyptus Oil;" employed externally in rheumatic affections, and in the manufactories chiefly for perfumery, soaps, etc. An excellent and very agreeable disinfectant if mixed with sawdust in the proportion of four ounces of oil to the bushel.

Ointment of Eucalyptus odorata. Employed in fetid suppurations and indolent wounds.

Red Gum. (From Eucalyptus rostrata of Victoria.) The delicate mucilaginous astringent possessed by this species of the Eucalypti renders it more effective than the Acacia catechu in all cases of dysentery, diarrhœa, and throat affections. Generally employed in the form of a syrup.

Essential Oil, Eucalyptus oleosa (Mallee Scrub). Employed chiefly in the manufacture of oil and spirit varnishes. Varnish containing this oil in the place of spirits of turpentine is said neither to bloom nor crack. It is a perfect solvent of india-rubber without heat.

India-rubber with the Essential Oil, Eucalyptus oleosa (Mallee Scrub). Showing tho two in combination.

Potash, Eucalyptus oleosa (Mallee Scrub). Obtained from the scrub after being deprived of its volatile oil.

Essential oil, Eucalyptus rostrata (Red Gum of Victoria).

Essential Oil, Eucalyptus sideroxylon (Iron-bark Gum). Essential Oil, Eucalyptus persicifolia (Peach Gum). Essential Oil, Eucalyptus citriodora (Sweet-scented Gum, Queensland). Essential Oil, Eucalyptus fissilis (Messmate). Essential Oil, Eucalyptus Stuartiana (Apple-tree Gum). Essential Oil, Eucalyptus goniocalyx (White Gum). (Specimen samples, showing the variety of aroma existing in the Eucalypti.)

Indigenous.—Essential Oil, Atherosperma moschatum (native Sassafras). Diaphoretic, diuretic, and sedative. Obtained from the bark. It exerts a specific lowering influence on the heart's action.

Atherospermin, Atherospherma moschatum (native Sassafras). An alkaloid obtained from the bark. Tonic.

Salts of Lime, Atherosperma moschatum (native Sassafras). Obtained from the bark.

Bark, Atherosperma moschatum (native Sassafras).

Essential Oil, Melaleuca ericifolia (Tea Tree).

Resin, Pinus callitris (Murray Pine). Obtainable in quantity from under the pines growing on ridges in the Mallee country.

Resin, Xanthorrhœa Australis (Grass Tree of Australia). Soluble in spirit, of a deep amber color. Obtainable in large quantities. Employed for staining wood to imitate cedar.

Non-indigenous.—Opium, Papaver somnifera (Sleeping Poppy). Cultivated in Victoria, yielding 10 per cent. of morphia.

Morphia, from the Victorian opium.

Capsules, Papaver somnifera (Sleeping Poppy). Specimens of growth.

Essential Oil, Mentha piperita (English Peppermint). Cultivated in Victoria, and distilled by exhibitor four years ago.

Dugong Oil, John Ching, Queensland.

Vanilla, Mauricienne Flore, Mauritius.

Essences from Queensland, Vegetables, Richard Daintree, Queensland.

Eucalyptus Preparations, David Clarke, Queensland.

Phosphorus Soap, S. J. Lyman, Montreal, Canada.

Pharmaceutical Preparations, William Saunders, London, Ontario. One hundred and fifty-six specimens of Fluid Extracts, Elixirs, Syrups, Wines, etc.; seventy-four specimens of Handkerchief Extracts, Butter of Cacao, Suppositories.

Pharmaceutical Preparations, Lyman, Clare & Co., Montreal, Canada. Eleven specimens of Spices, thirty specimens of Powdered Drugs of good quality.

Pharmaceutical Preparations, Lyman Bros. & Co., London, Ontario. Thirty-six specimens of Chemicals; fifty pounds of Nitrate of Silver, in large crystals; seventy-four specimens of Fluid Extracts.

PHARMACEUTICAL SPECIMENS FROM FRANCE.

French Pharmaceutical Preparations, Medicated Capsules, Limousin, Paris. The inventor of what is known here as "Cachets de Pain" exhibits the original apparatus for the manufacture of them; also some empty Cachets.

Mustard Poultice and Instantaneous Plaster, Rigollot & Co., Paris. A complete display of ready-made Mustard Plasters of this universally known make. They are always reliable.

Pharmaceutical Preparations, A. Beslier, Paris. Eau Distil. Roses, Eau Distil. Fl. d'Oranger, Eau Distil. Menthe Poivrée, Eau Distil. Laurier Cer, Alcoolat de Melisse, Alcoolat de Cique, Baume Tranquille, Alcoolat Fioraventi; and contained in jars, Thériaqué Fine., Unguent Mercuriel, Diascordium, Resin de Thapsia. A great variety of Plasters, Taffetas, Medicated Papers, Court Plasters, Plasters in bulk, of excellent quality.

Pharmaceutical Preparations, Raoul Bravais & Co., Paris.

Pharmaceutical Preparations, P. Garnier, Noyon, Oise. Sugar-coated Granules and Dragees.

Pharmaceutical Preparations, Léonce Reynal, Paris.

Pharmaceutical Preparations, Rigaud & Dusard, Paris. Pepsin in powder, of a brownish-yellow color; Pancreatin, an emulsion; Essence and Elixir of

Jaborandi; Dragees of a very fine finish; Gelatin Pearls, Pastilles, Capsules, etc.

Pharmaceutical Preparations, Ch. Torchon, Paris. A very handsome display of Chloral in crystals, blocks, and plates; Pearls of Tar, Chloroform, Castor Oil, and Turpentine; Ethereal Extract of Valerian, Ethereal Extract of Assafœtida; a large collection of Granules, which have the name of the medicinal ingredient stamped upon them. The antiseptic properties of Chloral are represented by a Guinea pig, which has been injected with a solution of it, which successfully withstood the temperature of "the heated term" without decomposition. Petrole obtained by synthesis.

Boudalt's Pepsin, Hottot & Co., Paris. Peptone and other digestive remedies.

Pepsin, Thomas Brothers, Avignon Vaucluse.

Medicines, Henry Badiole, Tarbes-Hautes Pyrénées.

Pharmaceutical Preparations, Vie, Garnier & Co., Paris.

Medicinal Capsules, Valby, Dijon. Pearls in great variety; Pearls made of gum and sugar, extra soluble.

PHARMACEUTICAL PREPARATIONS FROM AUSTRIA.

Prepared Quinine, Josef Gobetsky, Essegg.
Extracts of Soap and Pine Spurs, John Peter Mook, Vienna.

PHARMACEUTICAL PREPARATIONS FROM BELGIUM.

Pharmaceutical Preparations, Barthélémy Depuy, Brussels.

PHARMACEUTICAL PREPARATIONS FROM HOLLAND.

Plasters, J. P. H. Van de Loo, Venlo.
Plasters, W. Krol, Kampen.
Plasters, A. Mathijsen, Budel.

PHARMACEUTICAL PREPARATIONS FROM GERMANY.

Gelatin and Glue, Fischer & Schmitt, Höchst-on-the-Main, and Nied, near Frankfort-on-the-Main, Germany. The raw material used in the works consists of bones and skin-offal, the latter of which is to be obtained both dry and wet in the market. The annual production is over 330,000 pounds, and consists of various sorts of gelatin, from the finest to the most ordinary, and of glue gelatin. Gelatin red, Gelatin white, extra qualities, Nos. 1, 2, 3, 4. Two sorts of Glue Gelatins.

Otto Lindenhauer, Hanau. Produces principally gelatin of the finest quality, using as raw material the residues from the bone-button works, working up about 550,000 pounds yearly. The waste products are used in making superphosphates, of which 330,000 pounds are produced annually. The fine white gelatin finds application in the kitchen in place of isinglass, and in the clarification of wine and beer, as well as in the dressing of silk and straw hats. Further, in the manufacture of bristol-board, insoluble imitated tortoise-shell, mother-of-pearl, and in many color-mixtures for buttons, Cartonnagen, etc.

Various kinds of Gelatin.

Bartels & Koyemann, Faohse, near Schönebeck on the Elbe. Glue. 1. Glue of excellent quality, which by preference finds application in wood and textile industries, paper and carpet mills, and in the tightening of petroleum barrels.

2. Bone Fat, which after purification is used in the soap factories.

3. Bone Meal, which gives by decomposition with sulphuric acid about 2 per cent nitrogen and from 10 to 12 per cent. soluble phosphoric acid.

4. Bone Superphosphate, containing 20 to 22 per cent. of soluble phosphoric acid, which has met with general recognition, and finds preference above all other superphosphates.

5. Ammoniacal Superphosphate, made by addition of ammonium sulphate to the above, contains 10 to 11 per cent. nitrogen, and 10 to 11 per cent. of soluble phosphoric acid. Intended as substitute for Peruvian guano.

6. Purified Phosphate of Lime, for mixing with fodder. Is highly esteemed by farmers.

W. Suhr, Altona, Glue.

PHARMACEUTICAL PREPARATIONS FROM NORWAY.

Cod-liver Oil, shown by Bergen's Commercial Association, Bergen; J. Borthen, Trondhjem; F. Hanssen, Aalesund; L. C. Devold, Aalesund; J. H. Henriksen, Tromsö; C. Jordan, Trondhjem; Peter Moller, Christiana.

Modes of obtaining Cod-liver Oil.—All medicinal varieties of Cod-liver Oil may be grouped, with regard to appearance and mode of preparation, into two distinct classes: 1. Oil the produce of domestic industry, and 2. Oil prepared on a large scale by manufacturers.

Previous to the year 1853 the only varieties known belonged to the first of these classes, which unquestionably laid the foundation of the high repute Cod-liver Oil has attained since the time when, from being a favorite remedy in the huts of the Lapps and Greenlanders, it was first adopted by the medical profession, as a curative agent in some of the worst diseases which humanity is heir to.

This Oil varies in color from dark-yellow or light-brown to dark-brown, or rather black,—the so-called Tanner's Oil. It is not prepared by manufacturers, but (without exception) by the fishermen themselves, at their own homes, and never during their stay at Lofoten, its distinctive qualities being wholly dependent on the greater or less degree of carelessness and uncleanliness with which the raw material has been treated from first to last.

A brief account of the Lofoten Cod Fishery will furnish the best illustration, as thence it is that by far the greater part of the Cod-liver Oil exported from Norway is derived; and the characteristics distinguishing the other Norwegian fisheries, so far at least as the habits and practices of the fishermen are concerned, are, in almost every respect, identical with those of the Lofoten Fishery, certainly not more favorable.

As is well known, the Lofoten Islands constitute a vast rocky chain, stretching along the northwest coast of Norway, and divided from it by an arm of the sea called the Vestfjord. Time out of mind, vast shoals of codfish, impelled by the instinct of propagation, have repaired, at the beginning of the year, to these comparatively calm and shallow waters, to find a sheltered locality for their fry, when, after a three months' stay, they again return to their unknown home in the depths of the ocean. Many learned hypotheses have been started to show where that home can be, and some authors pretend even that these Lofoten cod have no fixed abode, but are continually crossing the Atlantic between the coasts of Norway and Newfoundland, visiting Iceland on their migratory passage; but the latest researches of M. Sars, made on the spot, lend no support to this opinion; on the contrary, it would seem that the numerous banks lying off the coasts are the localities selected by the cod when they leave Lofoten. The result of these valuable researches is of great importance when inquiring into the preparation and sources of Cod-liver Oil, for they show, beyond dispute, that the Lofoten fish are, in fact, a peculiar species, nowise related to the varieties that frequent the fjords of Söndmöre and Finmark; nor have they any connection with those immense shoals that visit the coasts of Iceland and Newfoundland. Hence there would appear to be some foundation for the belief commonly entertained, that the Lofoten Oil is essentially distinct from all other kinds, more especially in its remedial action; and it is quite certain that, in some respects, its physical properties differ very materially from those of other varieties; for instance, the Newfoundland Oil.

Early in the month of January the first shoals of cod begin to arrive. Moving in a northeasterly direction, they approach the coast of Norway, and concentrate themselves round the Lofoten Islands, entering their estuaries by the Vestfjord. During the month of January the fishing is not very productive, none but peasants and agricultural laborers living on or near the coast being at first engaged. Towards the end of the month, however, fishermen by vocation begin to arrive, many of them from considerable distances, the influx steadily augmenting up to the first week in February, when the great fishing may be said to commence.

To describe what is done with the fish does not come within our province. From the livers Cod-liver Oil is prepared, or rather "burnt," to use the more correct expression in vogue among the fishermen; not however at Lofoten, where all are fully occupied with the duties of their arduous vocation; besides which numerous local obstacles render it difficult, if not utterly impracticable, for the fishermen themselves to extract the oil on the spot; therefore the livers are packed into barrels and stowed away till the fishing is ended.

The homeward journey is not unfrequently of considerable duration, the fishermen having to encounter tempestuous weather in their heavily laden open boats ere they reach their destination. As a rule, the livers, many of them obtained in January, are not treated for their oil till May.

Whilst the livers lie stored in the barrels at Lofoten, and to a still greater extent during the homeward journey, much of the cellular tissue becomes disintegrated, and oil exudes. As soon as the barrels are opened, this oil, which is of a deep-yellow color, is poured off, and constitutes the quality known as "Raa Medicintran" ("*Raw*" *medicinal oil*), which fetches the highest price in the market. The livers are then thrown into iron caldrons, suspended over an open fire. The heat generated bursts those cells which have not previously undergone decomposition, and the oil is ladled off as fast as it becomes disengaged. The temperature is now raised, and as the heat increases the oil grows darker, till at length, when all that remains of the livers floats about as hard resinous masses in oil that is almost black, the process is considered to be finished.

The utter disregard for anything approaching to cleanliness by the peasant-fishermen, from the moment the livers are separated from the fish till the oil is poured off into casks for the Bergen market, has become notorious. Patients who consume this nauseous liquid are happily ignorant of the details attending its "extraction," details too disgusting to specify.

As a class, the fishermen do not care to dispose of the livers, even at advancing prices. They prefer to "burn" the oil themselves and take it to Bergen, their presence in that emporium of Nordland trade being imperatively required. Before passing into the merchants' hands the oil is classified by brokers appointed by government, into three qualities: 1, the "blank," or bright oil, of a deep-yellow color; 2, the "brunblank," or light-brown, the color of Malaga wine; and 3, the "brun" (brown), or, as it should properly be called, black oil, the brown color being scarcely perceptible, even in the strongest light.

Having early in life had ample opportunities of observing the negligence and utter disregard of cleanliness characterizing the process by which the Norwegian fishermen separated fish oil from the livers, Peter Moller was induced, many years ago, to give this important subject his undivided attention, hoping to discover some rational method whereby the old system, with its manifold imperfections, might be effectually superseded.

It was hopeless to think of reforming the habits of the fishing population, a class of people who, conservative to a degree, are obstinately tenacious of their ancestral customs. The first step, therefore, was to take the matter out of their hands altogether, and prepare the oil, on a large scale, in manufactories located in the immediate vicinity of the fishing-grounds. A method had then to be devised for perfecting the separation of the oil from the livers. Now, Cod-liver Oil obtained from Lofoten fish evinces an extreme affinity for oxygen; in other words, it rapidly undergoes decomposition, either by heat or exposure to the atmosphere; and this most serious impediment to the production of a pure oil could alone be obviated by the adoption of a system based upon the chemical constituents of the substance. After repeated failures, when attempting to compass his object by mechanical means, he eventually succeeded by the external application of steam. The following is a brief description of the process.

As soon as the fish have been landed the livers are taken out and submitted to treatment, a few hours being sufficient to affect the purity of the oil. All poor, small, bruised, and diseased livers are thrown aside, and those selected (all of large size) are carefully cleansed, by washing in several waters, from blood, membrane, and other impurities; the livers are then introduced into a machine which minces them into very small pieces, or rather reduces them to a soft pulpy mass. This pulp is transferred to an apparatus heated externally by steam, and the mass gradually warmed up to 100° or 102° Fahr. As fast as the oil exudes it is drawn off and filtered. Filtration completes the process. The fresher the liver and the lower the temperature, the purer and sweeter in taste will be the oil, whilst the color will be a pale yet brilliant yellow, possessing in a remarkable degree the power of reflecting light. The very pale, nearly colorless oil frequently met with has either been subjected to a bleaching process or mixed with colorless vegetable oils; in both cases the reflecting power and brilliant transparency will be absent, and the color will appear faded.

A system of pertinacious advertising has given rise among the public to the erroneous notion that the darker oil—more especially the light-brown—is the really genuine article in its pure and natural state, the lighter color of the pale varieties being ascribed to some refining process; but, from the information here supplied, it is manifest that the brown oils, no matter whence derived or by whom purveyed to the public, are all of them, without one exception, prepared by the poorer class of fishermen, from the refuse of putrid livers, and owe their darker color solely to the high temperature at which the livers have been treated in the process of extraction, and are contaminated by "putrefaction, wasting, boiling, or the like."

The difficulty so generally experienced in obtaining a pure, unadulterated Cod-liver Oil, did, at one time, bring the light-brown variety into some prominence, and not unnaturally, for, whatever its other defects, in the majority of cases it could certainly be relied upon as an unmixed article; indeed, by some practitioners it was recommended as the most efficacious kind; nevertheless, whenever the oil is dark-colored it is not in its natural state, the livers having been subjected to a high degree of heat in order to increase the yield of oil, whereby some of its most valuable therapeutic properties are sacrificed.

The pale oil is in no sense of the word a *refined* article; it is genuine *Ol. Morrhuæ*, pure and fresh as it existed in the hepatic cells of the living fish, and therefore endowed with that important quality which alone could constitute its proven superiority over all other varieties, viz., perfect digestibility, together with a sweet and even agreeable taste, and, as a natural consequence, an efficacy peculiar to itself.—*P Moller.*

Tonic Pills, H. S. Ditten, Christiana.

Cod-liver Oil, Bordewick & Co., Lynzvor.

PHARMACEUTICAL PREPARATIONS FROM EGYPT.

Pharmaceutical Preparations, Laboratory of the Government.

PHARMACEUTICAL PREPARATIONS FROM JAPAN.

Pharmaceutical Preparations, Dr. Nagaya, Imp. Board of Health, Tokio. These were highly creditable specimens of Japanese skill in this art.

PHARMACEUTICAL PREPARATIONS FROM BRAZIL.

Pharmaceutical Preparations exhibited by Maia, Farreira & Co., D. F. Z. Perdigao, Province of Maranhao, Province of San Paulo, E. Yiotti.

PHARMACEUTICAL PREPARATIONS FROM THE ARGENTINE REPUBLIC.

Fumigating Lozenges, Charles Serravalle, Province of Corrientes; Ana Barton de Torres, Province of Buenos Ayres.

Cholera Medicine, Lorenzo Puertas, Province of San Luis.

Peanut Oil, Pedro Escuch, Province of Buenos Ayres.

Balsamic Oil, Provincial Commission, Province of Córdoba.

Olive Oil, T. Davila Carmen, Province of La Rioja.

FROM SWITZERLAND.

Swiss Preparations, Artificial Swiss Table Honey, J. J. Hürlimann, Rapperswyl, St. Gallen.

Meal of Meats, Extract of Meat, Syrup of Meat, Casein, H. Naumann Burkhardt, Basle.

Lacteous Farina, Henry Nestlé, Vevay.

Condensed Milk, Children's Food, Medical Condensed Milk, C. Lapp, Freiburg, Gerber & Co., Thun Ct. Berne.

PHARMACEUTICAL PREPARATIONS FROM SWEDEN.

Gelatinæ Medicatæ in lamellis, G. Piltz, Stockholm. Thin sheets of Gelatin, containing different kinds of medicines, invented by Professor Almen, of Upsala.

TURKISH PREPARATIONS.

Olive Oil, exhibited by the Government of Samos; Government of Volania, Yanina; Hadji Yehrapalaki, Lachite, Crete; Pedros, Diarbekir; Aydonat Tanassi, Yanina; Didé Tassia, Yanina; Narda Yani Paoli, Yanina; Theophane Nicoforaki, Canea, Crete.

ITALIAN PREPARATIONS.

Italy is represented by one of her most celebrated vegetable products, that of Olive Oil, fifty exhibitors having sent specimens.

Castile Soap, E. Conti & Sons, Leghorn. They exhibit about one thousand pounds of their celebrated Castile Soap—white, green, and mottled—in five large blocks.

Pharmaceutical Preparations: Domenico Pagliaro, St. Stefano, Camostra, Palermo. Mannite, Confeti di; Phosphato e Ferro, Confeti all Iodo; Phosphato de Ferro; Sottonitrato di Bismuth; Citrato de Chinina; Confetti di Ferro Ridatto Iodogeno; Seltz all Alchermes; Iodo-ferro Cyanato di Chinina; Syrupo di Chinia Rosa; Ferruginoso Iodurato; Pulvero Ferro Manganico; Carbonato di Lithina; Granuli Aqua Ferrico Manganico; Carbonato di Litina; Gelatino di Phosph d'Calco.

PREPARATIONS FROM SPAIN AND SPANISH COLONIES.

Syrup of Protiodide of Iron and Ferruginous Peruvian Bark, Joaquin de la Rosa-Martinez, Berja, Province of Almeria.

Almond Oil, Magnesia, Ferruginous Cod-liver Oil, Fortuny Brothers, Barcelona.

Cocoa Butter, Cocoanut Oil, etc., Juan Mondova Vte, San Juan, Porto Rico.

Cocoa Butter, Castor Oil, Celestino Dominguez, Guyana, Porto Rico.

Pharmaceutical Preparations, Ferrera & Battle, Barcelona.

Pharmaceutical Preparations, Syrup of Jaborandi, Syrup of Radish, Syrup of Walnut Leaves, Syrup of Pine-sap, Syrup of Protoxide of Iron, Lactophosphate of Calcium, Chloroform, etc., A. Arola & Francisco Domenech, Barcelona.

Essence of Sarsaparilla, Extract and Syrup of Eucalyptus, Cod-liver Oil, Opodeldoc, Tincture of Arnica, Juice of Fumitory, etc., Manuel Marin, Cordoba.

Effervescing Citrate of Magnesia, Ferruginous Cod-liver Oil, Iodinized Syrup of Radish, Extracts of Cinchona, Sarsaparilla, Guaiac, Conium, Pastilles of Marshmallow and Carragheen, Pills, Conserves, etc., G. Formiguera, Barcelona.

Oil of Lemon, Juan Gibert y Soler, Torredembarra, Tarragona.

Blister, Fuentes & Sons, Palencia.

Extract of Digitalis, Essence of Sarsaparilla, Monge & Sanz, Bonifacio Soria.

Extract of Tar, Arsenic, etc., Tomas Cuchi y Deixens, Tarragona.

Unalterable Syrups, Joaquin Delgado, Sevilla.

Extract of Licorice, Flor. Carenon & Tur, Zaragoza.

Preservative to prevent Oxidizing of Metals, Diaz & Acebedo Cleto, Havana, Cuba.

Wax obtained from the Poplar, Louis Gallardo Bastant, Barcelona.

Essence of Turpentine, Falcon, Ruiz & Llorente, Coca, Province of Segovia.

Licorice in Paste, Rolls, and Powder, MacAndrews & Co., Coria, Province of Sevilla.

Oil of Sweet Almonds, Francisco Fuster, Palma de Mallorca, Balearic.

Extract of Licorice, Huelin & Son, Guillermo, Malaga.

Vegetable Balsam, Joaquin Castro Burguillo, Sevilla.

Walnut Oil, Count of La Vega Grand, Las Palmas, Canaries.

Pharmaceutical Products: Syrup of Biphosphate of Calcium, Syrup of Quinia, Iodide of Iron, Wine of Cinchona, Iodine, and Orange Peel, Salustiano Orive, Bilbao, Province of Vizcaya.

Essences, Pastilles, Syrups, etc., twelve varieties of solid extracts, six of Pastilles, etc., Juan Rubia, Perez, Granada.

Medicinal Syrups and Orange Flower Water, Syrup of Hypophosphite of Calcium, Iodinized Syrup of Horseradish, Syrup of Iodide of Iron, Syrup of Citron Peel, Gomez Pompeyo, Barcelona.

PRODUCTS FROM PORTUGAL.

Portugal has the largest collection of Olive Oils and Wines in the Exhibition. Three hundred and twenty-three exhibitors of Olive Oil alone.

Pharmaceutical Preparations exhibited by José Drack, Jr., Lisbon; Pedro Augusto Franco, Belem; Joaquin Figueiredo, Aviz; José Liberbador Ferraz, Coimbra; Manuel d'Asfes Galiano d'Oliveira, Oporto; Antonio Maria Mendes Gragera, Vila Nova de Reguengos; Manuel Vincent de Jesus, Lisbon; José Joaquin Rei, Lisbon; Nuno Freire dias Salguerino, Oporto.

V. ESSENTIAL OILS, PERFUMERY, ETC.

Wenck & Co., New York, had a very fine display of perfumery. Their pavilion represented an arbor covered with flowers. There are six side posts and a centre post, imitating heavy bamboo poles. The roof of bamboo canes, and the entire structure was covered with vines of artificial flowers. The cases were filled with handsome bottles of choice perfumery. Salesladies were in attendance diffusing fragrance through numerous atomizers. Glass engravers were constantly at work, executing orders for cutting names on toilet bottles while the purchasers remained waiting.

Young, Ladd & Coffin, of New York, had an elegant pavilion of Moresque architecture, designed by R. M. Upjohn, architect, elaborately decorated with gold and colors, in which they made a fine display of Lundborg's Perfumery. These perfumes are entirely of American manufacture, and in delicacy of fragrance and the beauty of the packages in which they are put up, they compare most favorably with the best French goods in the Exhibition. In one side of the pavilion stands a "Floro-Deliac" fountain of bronze, heavily plated with silver. The design is of a plain cylindrical shaft with three figures in basso relievo. The shaft supports a circular basin filled with flowers. In front of the bank of flowers is the escutcheon of the State of California, with a grizzly bear upholding a large lily, from which issues a jet of California water. In the centre is a figure of a little girl, holding in one hand a rose and in the other a pitcher, from which issues a stream of Lundborg's White Rose Extract. On the right is a cherub, in the character of a haymaker holding a sheaf of hay, from which drops "New Mown Hay" Extract. Another cherub is dressed as a jockey bestriding a hobby horse. In one hand he holds a vial, from which he pours "Jockey Club" Extract. The air all around was filled with these perfumes, and the fountain was always surrounded by a crowd of ladies perfuming their handkerchiefs by the jets from the fountain.

Henry Tetlow & Bro., Philadelphia. A very choice assortment of Lily Whites, Toilet Powders, and Handkerchief Extracts, tastefully displayed in a very elegant and costly case.

H. G. Hotchkiss, of Lyons, Wayne County, New York, exhibits Essential

Oil of Peppermint, Spearmint, Wintergreen, Tansy, Wormwood, and Pennyroyal; also some Lozenges flavored with his double refined Oil of Peppermint.

Samuel C. Upham, Philadelphia. Liberty Bell Bouquet, which was honored with a medal at the Exhibition of the Franklin Institute in 1874. Liberty Bell Cologne, put up in bottles made in similitude of the old Independence Bell. Florida Water, Bay Rum, Bay Rum Hair Tonic and Dressing, all of them put up in neat and attractive styles. A cantata, entitled "Columbia's Centennial Greeting," which was liberally distributed, demonstrates that the exhibitor is a poet as well as a perfumer.

C. B. Woodworth & Son, of Rochester, N. Y., had a large and elegant case, in which they made a display of Fine Toilet Soaps, Colognes, Extracts, Pomades, and general toilet articles. Their specialty seems to consist in low-priced goods suitable for the sales of country stores.

Malcolm & Stevenson, of Philadelphia, Flavoring Extracts of all kinds, in bulk, and put up in small bottles for family use.

Chesebrough Manufacturing Company, New York. Vaseline in a pure state for medicinal, pharmaceutical, and toilet uses. Pomade Vaseline for the toilet, being pure vaseline perfumed. Cold Creams and Camphor-ice made from vaseline with wax, perfumes, etc. Vaseline, or Petroleum Jelly, is described as being made by the following formula: Crude petroleum is subjected to dry heat in iron vessels until the lighter portions being driven off in vapor, there remains back the heavier portions of the oil in a highly concentrated state. This substance is then carefully and repeatedly filtered through bone-black (substantially as white sugar is made), the result being "vaseline," which appears as a solid jelly of a white opal color, being perfectly neutral, and entirely free from taste or odor. It liquefies at about 95° Fahr., boils at about 600° Fahr., will not crystallize nor oxidize, and will never become rancid. No chemicals of any kind are used in its manufacture, it being purified simply by filtration.

Vaseline is claimed to possess a remarkable efficacy as a liniment and emollient preparation for the treatment of wounds, burns, and skin diseases. It can be advantageously employed as a base for cerates and ointments in preference to animal and vegetable fats, as it is not like these liable to oxidation, but can be kept indefinitely without change. The production of vaseline is said to have led to a revival of the ancient process of anointing in the Turkish baths of New York, Brooklyn, and San Francisco. Although the new product, vaseline, and the process of making it, are secured by letters-patent, its use for medicinal purposes is in no way restricted nor proprietary, like that of a patent medicine, but is perfectly open to the use of all.

E. F. Houghton & Co., Philadelphia, exhibit Cosmoline, a heavy paraffinous oleaginous hydrocarbon, obtained from petroleum, highly purified, concentrated and separated from offensive and irritating properties. It is used as a base for cerates and unguents, pomades, etc. It is exhibited in its various preparations, and put up in handsome glass jars and other attractive packages.

W. H. Savournin, Philadelphia, Pa., Lilywhites, Toilet Powders, Rouges in great variety, neatly put up and tastefully arranged.

Concentrated Perfumes, Lorenz Bros., Toledo, Ohio, a general assortment of Perfumery, which they state to represent the exact style and quality which they send out daily to their trade. They claim for their concentrated perfumes great strength and extreme durability. Their communication states that the Exposition has been the means of securing for them several very important orders from South America. The catalogue enumerates the following novelties in handherchief extracts: Lily of the Lakes, Winter Roses, Drooping Zolus, Cherokee Rose, Ion, Kuskus, Coffee Blossom, Silver Wattle, Young Lubin, and Egyptian Lotus.

Fritzsche, Schimmel & Co., New York, Fruit Essences and Essential Oils of Pimento, Sassafras, Cloves, Ginger, Cumin, Cubebs, Wormwood, Cedarwood, Wintergreen, Copaiba, Cognac, Pennyroyal, Petitgrain, Peppermint, Spearmint, and Tansy.

L. B. Hotchkiss, of Phelps, Ontario County, New York, Oil of Spearmint, Peppermint, Tansy, and Wintergreen.

Henry C. Blair's Sons, of Philadelphia, have quite a handsome case, in which they exhibit Prepared Wheat Food, Liquid Rennet, Racahout, Wine of Pepsin, and various Elixirs, Perfumery, Tooth Powders and Washes, Pomades, etc., of their own manufacture. They also exhibit the Fountain Syringe, a new syringe, applicable to the various uses for which such an instrument is required. It has quite a large reservoir of India-rubber, which is intended to be filled with the medicinal preparation to be used. This is then hung up at a considerable elevation above the point at which it is intended to make the application, and the necessary force is obtained by gravity instead of by the use of a piston, as in ordinary syringes. Their well-known specialty, Castor Oil and Glycerin Pomade, of course, occupies a prominent position.

Richard H. Watson, Philadelphia, a good assortment of Handkerchief Extracts, purporting to be of the manufacture of De Vie & Cie. Being on an open stand the quality could be more readily examined than that of those in locked cases.

Alexander Fries & Bros., of New York and Cincinnati, exhibit Flavoring Extracts of all kinds, together with Oils and Essences of all kinds for the compounding of liquors. They also exhibit samples of Oleomargarin or Artificial Butter.

J. B. Williams & Co., of Glastonbury, Connecticut, exhibit "Genuine Yankee Soap," for shaving, and a very large assortment of Toilet and Shaving Soaps.

E. W. Hoyt, Lowell, Massachusetts, exhibits Hoyt's German Cologne, in large and small bottles, very cleverly arranged to the best advantage in a handsome case, mounted on an elegant stand.

William H. Reed, of Baltimore, exhibits "Grand Duchess" Cologne.

Thomas Worsley & Co., of Philadelphia, exhibit Walnut Oil Military Shaving Soap, and other fine Shaving and Toilet Soaps in great variety; also an assortment of Toilet Powders. A model of the Independence Bell, about three feet high, made entirely of soap, is shown by this exhibitor.

R. & G. A. Wright, of Philadelphia, make a very handsome exhibit of fine Toilet Soaps, Shaving Soaps and Creams, etc. They also show a general assortment of the finer toilet articles, such as Perfumery, Extracts, Pearl Powders, Rouge, Pomade, Dentifrices, Colognes, etc. They also obtained the privilege of selling from their stand, and appeared to do a lucrative retail trade.

Wolf Bros. & Keech, of Centreville, Mich., exhibit Essential Oils of Spearmint, Pennyroyal, Wormwood, Tansy, and Peppermint. They also display photographs of their distillery buildings. Their method of packing oils is illustrated by an exhibit of shipping cases.

Aschenbach & Miller, Philadelphia, Handkerchief Extracts in bulk, comprising all the favorite odors. Prairie Flower Cologne, Florida, Magnolia, and Verbena Waters. Artificial Flavoring Extracts and Pure Ethers used in compounding them. Formiate, Acetate, and Butyrate of Ethyl. Acetate, Butyrate, and Valerianate of Amyl. Extracts of Vanilla and Lemon. Holland Gin Flavor. Centennial Sauce for the table. The firm certainly deserves credit for affording the visitor every opportunity of thoroughly inspecting and examining the goods, by having them in open bottles without being locked up, and without being marred by the ubiquitous notice: Ne touchez pas. You are requested not to touch.

Arthur Fricke, Philadelphia, exhibits a neat case of Colognes, Toilet Soaps, Extracts, Cosmetics, etc., in great variety.

J. W. Colton, Westfield, Mass., makes a handsome exhibit of "Colton's Select Flavors" of Fruits and Spices, for cookery. A large tin box of Vanilla Beans is also shown by this exhibitor.

C. R. Taylor & Co., Philadelphia, exhibit Fine Toilet and Shaving Soap, Cologne, Extracts, and Toilet Goods generally.

Joseph Burnett & Co., Boston, Mass., Burnett's Standard Preparations, including Flavoring Extracts for cooking, "Cocoaine," for the hair, "Kaliston," for the complexion, "Oriental Tooth Wash," Colognes and Perfumery Extracts. These exhibitors also had a handsome little fountain of black marble, from which a stream of cologne water was constantly flowing, and where ladies resorted in great numbers to perfume their handkerchiefs. During the latter part of the exhibition they were also privileged to retail their productions.

Colgate & Co., New York, Toilet Soaps in great variety, put up to closely resemble, in appearance, the finest imported French soaps. They also exhibit Extracts, Cologne, Bay Rum, Violet Water, Spirits of Lavender, and other toilet articles,

Robinson Brothers & Co., Boston, exhibit "Indexical" Toilet Soaps in great variety. A prominent object in their case is a beautiful female bust modelled entirely from soap.

D. R. Da Costa & Co., of Philadelphia, exhibit "Flor de Antilles" Toothwash.

Hale & Parshall, of Lyons, Wayne County, New York, exhibit pure Oil of Peppermint, Oil of Spearmint, Oil of Wormwood, and Oil of Wintergreen.

Herman W. Atwood, of New York, exhibits "The Atwood Cologne," put up in a handsome and attractive style, with bright-colored heraldic labels.

Cologne. Surgical, Medicinal, and Pharmaceutical Plasters. Lung Protectors. George E. Mitchell, Lowell, Mass.

Transparent, Washing, and Shaving Soaps in cakes; also in sticks, put up in neat cases for the convenience of travellers, A. & F. Pears, Lanadron Soap Works, Isleworth, near London, W.

Soaps, etc., Wright & Holdsworth, London.

Sigismund Cohne, London, E.C., Patent Chameleon Soap, consisting of a compound of permanganate of potash, with the best quality of ordinary soap, and the following advantages are claimed for it: 1st. It is devoid of any smell whatever. 2d. Is handy for physicians in contagious cases and in the dissecting-room. 3d. It possesses hygienic properties, adapting it to the toilet and bath. Although the disinfecting property of permanganate of potash has long ago been recognized by the medical faculty, it has not been previously used as a soap.

Eugene Rimmel, London. The productions of this renowned house are very advantageously exhibited in "Rimmel's Floral Temple." This elegant structure is a combination of large plate-glass show cases, counters for selling and showing goods, and private office. From the great variety of choice perfumes and specialties we select: The American Centenary Bouquet, Vanda, Henna, Cuir de Russie, Tea, Coffee, Etoile du Nord, Duke of Edinburgh. Glycerin, Cold Cream, and Melloglycerin, for the complexion. Violet-scented Oatmeal for the hands. Ihlang Ihlang and Opoponax Toilet Soap. Malaktikon Shaving Soap. Hamigaki, a Japanese dentifrice. Perfume Vaporizers, Persian Ribbon, Perfumed Sachets, Perfume Fountains, Crackers, Perfumed Valentines, and many other similar novelties. Fancy Soaps and Cold Creams of various odors are exhibited in large, tall, obelisks, and they do not appear to have suffered from the unusually hot weather of the past summer.

Samuel Perks, Hitchin, Herts. True English Oil of Lavender, and Handkerchief Extracts prepared from it. This gentleman has adopted the somewhat unique title of "Lavender Farmer," and sends the following interesting account of the culture of lavender:

"Comparatively few persons are aware to how large an extent the culture of lavender for commercial purposes is carried on within a radius of thirty miles from London. In the county of Surrey alone there are nearly three hundred and fifty acres of land devoted to its growth, and the total extent of the lavender fields in the London district cannot fall far short of five hundred acres. Although it is only of recent years that the culture of the plant in England has been sufficiently extensive to raise it to the dignity of a recognized industry, the dried flowers have been used from time immemorial as a perfume; indeed, it acquired the name given to it by the Romans, *Lavandula*, from the use to which it was applied in scenting the water of the bath. Pliny also mentions that a very costly and precious ointment was made from the aromatic leaves, and during the time of Elizabeth the oil and the water were both recommended to persons afflicted with palsy. Even at the present time it is a very common practice in the country where lavender plants are growing in gardens, to gather and steep the flowers in vinegar, which is much esteemed as an excellent remedy for bruises, etc.

"The introduction of the lavender plant into England is supposed to have been about the year 1568. At Hitchin, about fifty-four years ago, the experiment was first made by Mr. Perks of growing lavender as a source of profit. So well did it succeed, that there are now about thirty-five acres of land in Hitchin devoted to its culture, yielding sufficient essential oil to produce upwards of two thousand gallons of lavender water annually. A visit to the fields and laboratory during the latter part of July or the beginning of August, when the flowers are in full bloom, is in itself worth the trouble of a journey to Hitchin, to say nothing of the special attractions which the neighborhood offers to the botanist, geologist, and antiquary. The largest field is situated at the western side of the quaint old town, near the house in which George Chapman, the friend of Shakspeare and Ben Jonson, completed his translation of Homer.

"The cultivation of lavender is very expensive if well carried out. The soil must be in good condition previous to planting; much labor is also required throughout the year to keep the ground perfectly free from weeds. It is an uncertain crop, the yield of essential oil varying considerably, some seasons as much as forty to fifty per cent. less than others; it also depends much upon the weather during the months of May, June, and July being bright and sunny, in which case a good yield is generally the result, but if wet weather sets in or an absence of sun, the quantity is greatly reduced. An acre of lavender produces from three to six Winchester quarts, or fifteen to thirty pounds weight, according to the season or age of the plants. The soil best adapted for lavender is a loamy one, with chalk subsoil, a warm situation sloping towards the south, and perfectly free from trees.

"In making a plantation of lavender, the young plants are bedded out in November, at a uniform distance of one yard apart; formerly they were placed at only half that distance, but it is found that a heavier yield is produced from plants set a yard apart than when planted closer together. When three years old the plants are at their best, and it is more profitable to uproot them, and set a fresh plantation, the young plants yielding a much larger quantity of essential oil. When the plants are twelve months old, the whole of the ground is forked between the rows of lavender, instead of ploughing (the usual custom), which the proprietor considers an injurious one, as so many of the small fibres are cut into in passing the plough between the rows. In the autumn the tens of thousands of plants are clipped in with shears, giving strength to the plants, keeping them nearer the ground, and producing at harvest a larger crop of flowers.

"The harvest time depends much on the state of the weather, but it usually commences about the first week in August. The flowers are cut with a sickle, bound up in sheaves, weighing about twenty-two pounds each, and immediately carried to the distillery; there the stalks are cut off, leaving but little more than the flowers, by which the bouquet of the oil, afterwards extracted, is much improved. Great care is needed on the part of those who handle the sheaves in the distilling-house, to guard against being stung by the bees, which remain attached to the flowers. The temperance, industry, and providence of these insects are proverbial, yet their behavior in lavender fields, especially towards the end of the season, when the flowers are fully developed, cannot be too severely reprobated, so careless are they of the good reputation they have earned, that they refuse to leave their luscious feast, even when it is laid on the trimming bench, and hundreds are thrown into the still, notwithstanding the efforts to dislodge them, in a state of helpless intoxication. Virgil mentions lavender as a favorite flower of bees, and recommends it to be planted in the neighborhood of their hives. This is the case at the present time, as thousands of bees visit the lavender fields every day during the harvest to gather honey. The time occupied in gathering and distilling the lavender belonging to the proprietor is about seven or eight weeks, a still holding two hundred gallons being filled four times each day.

"About fifteen years ago a disease attacked the plants, which caused the destruction of many plantations, and with great loss to the growers. Even now the plants suffer to some extent, although not so much as some years back. Some attribute the cause to overmanuring the land, thereby forcing the plant too much, and rendering it more susceptible of disease; others, that it results from the aroma of the flowers, which in excess it appears has a poisonous influence, but little at present has been discovered to trace the cause, or a remedy to prevent it. As regards the lavender fields at Mount Pleasant, Park Piece, etc., the proprietor has found that a change of soil has done more to mitigate the disease than any other method."

Perfumery and various Pharmaceutical products, Evans, Son & Co., Liverpool, and Evans, Lescher & Evans, London.

Fine Toilet Soaps, Glycerin, Fatty Acids, Night-lights, Tapers, Candles, Paraffin, and Stearin, Price's Patent Candle Company, London.

J. & E. Atkinson, London, exhibit a handsome case of their famous Perfumery and Toilet Articles. Some of their Colognes and Extracts are put up in richly-cut crystal toilet bottles. Sachets, Perfumed Powders, and luxurious Toilet Cases are shown in great variety. Stephanotis, Sarcanthus, and White Rose Odors occupy prominent positions. The majority of their labels are of that peculiar quaint and ugly style to which we have become accustomed on their White Rose Extract.

Fine quality toilet brushes, Extracts for the handkerchief and toilet soaps, Low, Son & Haydon, London.

Fine brushes, ivory paper knives, photographic stands, ivoryide brushes, and mirrors, George Barton Kent & Co., London.

Essential Oils from Jamaica, Robert Thomson, Kingston, Jamaica.

Pimento Berry Oil (Eugenia pimenta). This oil has been recommended for perfumery purposes. It is used for perfuming soap.

Pimento Leaf. The leaves with twigs yielded rather more than 0.75 per cent. of oil.

Lemon Grass (Andropogon schœnanthus). Used for perfumery, and medicinally. Plant common.

Seville Orange (Citrus bigaradia). Distilled from the rind. Tree plentiful in Jamaica. 580 oranges weighing 180 lbs. yielded 12 ozs. of oil.

Seville Orange Leaves. Lemon (Citrus limonum). Distilled from the rind. Tree common.

Sweet Orange (Citrus aurantium). Distilled from the rind. Tree plentiful.

Juniper Wood (Juniperus barbadensis). Distilled from the wood. 0.5 per cent. of oil.

Eucalyptus globulus. Distilled from the leaves. 0.75 per cent. of oil. Pimento Berries. Pimento Leaves. Eucalyptus globulus Leaves. Juniper Wood.

Khus, Khus Rhizome (Andropogon muricatus), better known here by its French name *Vitivert* root. According to Piesse, this rhizome is utilized in the East by being manufactured into awnings, blinds, and sunshades, called *Tatty*. During the hot season, these are sprinkled with water for the purpose of cooling the apartments, and at the same time agreeably perfuming them with the odorous principle of this rhizome.

Rigaud & Co., Paris, represented by E. Fougera & Co., of New York. This firm claims to have been the first to introduce the now famous Ihlang Ihlang. In addition to various preparations of this perfume, they also exhibit the pure oil of Ihlang Ihlang from Steek-Sartorius. Although the cost of this is more than double that of the finest Kyzanlik Otto of Rose, it is yet very much cheaper than another new essential oil, which has been more recently introduced, coming also from the Philippine Islands, namely, the oil of champacca. The plant furnishing this is said to be also an orchid.

Extracts of Kananga and Champacca, Kananga rice powder, Malagueta toilet water, and many other novelties in perfumery, found a ready sale from their stand.

Violet, Paris. This perfumer exhibits and sells his productions in a small pavilion constructed chiefly of glass and iron. It is located near the Moorish Villa, and at some distance from the Main Building. The variety of his manufactures is very great, so that in looking over his cases we become entangled in a maze of such highsounding titles as: Pylodermal Antipellicular Regenerating Lotion, Antiphelideine Lotion, Harem Serkis, Kohenil, etc.

His chief specialty, however, appears to be paints for the face, hands, lips, arms, eyelashes, etc., of every quality and hue. He styles these, fards, and devotes an elaborate pamphlet on the art of acquiring beauty to their minute descriptions. He enumerates white and red fards of every shade, fards for indoors, fards for out of doors, fards for daylight, fards for gaslight, fards for court and ball, fards for the eyes, fards for the lips, résean d'Azur for veins. Several of these preparations are modestly marked 100 sh. per box. His injunction, quoted from Ovid: "Femmes, apprenez l'art d'embellir vos visages," does not, therefore, appear to be quite disinterested.

Lautier Fils, Grasse, Maritime Alps, France. Materials used in the manufacture of perfumery. Fine Virgin Olive Oil and Oil of Sweet Almonds. Oils of Estragon, Hyssop, Celery, etc.

The Montblanc Oil of Lavender Flowers is of an unusually fine quality, so that many perfumers prefer it even to the English. The circular issued by the firm makes the following statements:

Lavender (Lavandula vera) grows on the mountains which cover the southeastern corner of France and part of Piedmont, not farther west than the river Rhone and not beyond the 44th degree of northern latitude.

The best quality of oil is drawn from flowers grown on the highest points of that chain which has given its name to the department, "Alpes Maritimes." The flowers are cut in July and August. 150 to 200 kilos flowers give 1 kilo essential oil, when the season is favorable.

Rose-Geranium (Geranium odorat gall.) is grown in the environs of Grasse, but on a larger scale in Algeria. Geranium grown in France yields a finer oil but much dearer, as more than 1000 kilos of plants are needed for 1 kilo. Algerian plants are cut twice a year, in June and September, and 800 to 1000 kilos of them produce 1 kilo oil.

Roses of Grasse. The culture of roses has taken an enormous development. The firm Lautier fils works up nearly 100,000 kilos every year for manufacturing pomades, scented oils, and rosewater. 10,000 kilos of roses produce hardly 1 kilo essential oil; this oil is green and far more consistent than the oriental otto. Roses are mostly distilled for the sake of rosewater.

The specimen of Rose Oil exhibited by the firm is of an odor closely resembling the French rose pomade, and quite distinctive from that of the Turkish oil. It remains solid even during our summer weather. It is valued at $18 to $20 per ounce.

Jasmine. The flowers of Jasmin are gathered from July to October from a little bush cultivated in the gardens of Grasse. It is very sensitive to temperature and ground, and requires much care and watchfulness. The better the plantations are exposed to the sunbeams, the more powerful is the perfume of the flowers. One hectare of ground planted with Jasmin yields about 2000 kilos flowers in a year.

Tuberose, a bulbous plant, blooming in the same season. The culture gives a good deal of trouble, as every year, in November, planters must take out the onions for guarding them from humidity and cold, and replant them in April.

The produce in good years reaches 2500 kilos per hectare.

Réséda (Mignonette). This plant is delicate, and must be handled with much care. Nevertheless the crops fail pretty often in consequence of late colds. Réséda is sown in December, and commences flowering in March. The flowers gathered in March and April give the finest perfume.

Jonquille, a bulbous plant which blooms in March. The flowers are of a fine bright-yellow color, and the sweet odor is obtained in the same way as from the Jasmine and Tuberose flowers by the "cold enfleurage-process." Tables of glass in wooden frames are spread over with fat and the flowers strewn upon it. These frames are piled up, so as to form columns of about a man's height. The flowers are daily renewed until the fat has taken the sufficient degree of perfume.

Violet. The species of this plant employed in perfumery is the so-called double, and cultivated on a large scale in the shadow of the olive trees which cover the territory of Grasse. The flowers are gathered in February and March. The harvest is subject to climatic influences and varies much. While in some years more than one hundred thousand kilos are brought in, not even the fourth part of that quantity is the result of other crops.

Muguet and Narcisse grow wild in the environs of Grasse. Muguet (Mayflower) is gathered in February and March; Narcisse (Daffodil) in April. The pomades prepared with these flowers are very useful to the manufacturing perfumer.

Cassie, a gold-colored, sweet-smelling flower, is gathered from a small tree (Acacia farnesiana) which adorns in large quantities the declivities on the seaside. The tree begins to give flowers about the end of August, and with favorable weather continues to the end of the year.

French Perfumery, Toilet Soaps, Fine Perfumery, and materials used in compounding perfumery, Violet, Godifroy & Co., Paris.

Kyzanlik Oil of Rose in original copper cans covered with felt, E. Colas & C. Christoff, Paris.

French Essential Oils, Rose and Orange Flower Waters, Handkerchief Extracts in bulk, Floral Pomades, and Fixed Oils for the manufacture of Perfumery, Louis Hermann, Paris.

Handkerchief Extracts, Fine Toilet Soaps, Lait de Cacao, etc., Adolphe Delettrez, Paris.

Perfumery, Oils, and Pomades for perfumers' use. Fine quality bottled Olive Oil, French Essential Oils, J. Mottet & Co., Marseilles.

Roure-Bertrand Fils, Grasse, Maritime Alps, France. This house makes a very elegant display of their productions, consisting chiefly of materials for the use of perfumers. The bottles containing their goods are furnished with a new and unique style of label, the groundwork of which somewhat resembles the so-called oxidized silver jewelry in tint. Among the numerous oils exhibited, we notice Oil of German Chamomile quoted at 900 frs., Oil of Cascarilla 100 frs., true Oil of Verbena 75 frs., Oil of Orris Root 300 frs., Oil of Rose of Grasse 2000 frs., Oil of Vitivert 550 frs., Oil of Ylang-ylang 1200 frs., Oil of Neroli Bigarade Pélate 360 frs.; all per kilogramme. They also exhibit what they term the natural essences, of which they are the inventors and sole fabricants, obtained direct from the flowers without employing other agents. Of these they quote Cassie, Jasmine, Jonquille, Reseda, and Tuberose at 1250 frs. per kilogramme, Violet at 1600 frs. The most highly odorous pomades usually sold are known in commerce as No. 24. This firm exhibits No. 240 Pomades of various odors, quoting them at from 200 to 250 frs. per kilogramme. They state that by their process they are able to impregnate grease with ten times more perfume than can be done by the old methods used by their competitors. These pomatums, so valuable to the perfumery trade, have another precious advantage, that of never turning rancid. To prove this assertion they exhibit here the same Pomatums, No. 240, which they had shown in Vienna in 1873, accompanied by types of recent manufacture, and they invite a comparison of those put up three years ago with the fresh ones recently made. The Pomatums, No. 240, enable perfumers to make fresh Pomatums therefrom at any time, which is an advantage, particularly for greases made cold, such as Jasmine and Tuberose. This discovery may prove to be of great use and advantage in perfumery. Oil of Orris Root is said to have never been obtained before, all articles offered hitherto under that name having been more or less disguised compositions. In operating upon the Orris Root they have discovered two products, viz., the Real Liquid Essence of Orris, which can be used for all purposes, like all other Essential Oils, Butter or Paste Orris Root, particularly adapted for flavoring grease and preparing Pomades. White infusions of Storax, Calamita, Liquid Storax, Benzoin, Balsam of Tolu and Peru, Russia Leather, Orris Root, and Musk are exhibited and claimed as a new discovery. The advantage of their use in compounding extracts is that they will not stain or soil linen fabrics.

Antoine Chiris, Grasse, Maritime Alps, France. In addition to the usual *matièrès premières* for the use of perfumers, this well-known firm exhibits blocks of Paraffin impregnated with the odors of Orange Flowers, Rose, Reseda, Cassie, Jasmine, and Tuberose. The very evident advantage of Paraffin over animal and vegetable fats is that it can be preserved without change for almost any length of time, while the readiness with which particularly Jasmine and Tuberose Pomade become rancid often inflicts serious loss on the perfumer. It remains to be investigated whether Paraffin is equally capable of extracting the valuable odorous principles of the flowers. We also notice the Oil of Ylang-ylang, Oil of Kaiña, Oil of Iris, and Essence Spring.

Poiret & Son, Paris. Fancy soaps, penetrated with colored portions forming letters and various ornaments.

Perfumery, F. Viard, Paris.

Figaro Water for coloring the beard, Pomades for retailing. Viguier, Manager French Hygienic Society, Paris.

Eau de Cologne, Johan Maria Farina, Cologne. This is exhibited by one of the extensive family, each member of which claims to be the originator of the perfume named after their native city.

F. Maria Farina, Cologne. Another headquarters for the only genuine Eau de Cologne; also Salicylic Acid Mouthwash, Handkerchief Extracts, and Toilet Vinegars.

Essential Oils in great variety and of excellent quality; also a variety of Ethers. Schimmel & Co., Leipsic.

Perfumery, Fine Toilet Soaps and Candles, Ignatz Weinick, Stockerau, Austria.

Perfumery, Copying Ink and Colors, Ferdinand Fritsch, Vienna.

Toilet Soaps of fine quality and in great variety, J. Demartini, Prague.

Perfumery and Fine Toilet Soaps, Franz Prochaska, Prague.

Fine Essential Oils, Essences, and Ethers, Jacques Pollak, Vienna.

Coloring for Butter and Cheese, Rennet Extract for Cheese, Varnishes, Meyer & Henckel, Copenhagen.

Oil of Bay Leaves and true double distilled Bay Rum, A. H. Riise, St. Thomas, West Indies.

Handsome assortment of Handkerchief Extracts in tasteful styles, Pomades, Sachets, Tooth Pastes, Colognes, Poudre de Riz, F. Pauli, Jönköping, Stockholm, Sweden.

Fancy Soaps. Attractive display of Eau de Cologne royale, ornamented with the photograph of King Oscar II. Toilet Vinegar, Sachets, Kongerögelse (Fumigating Powder), Transparent Shaving Soap, Amber Lavender. Daniel Steen, Christiana, Norway.

Hairdressing and Perfumery, Andr. Pettersen, Bergen, Norway.

J. P. Granholm, Stockholm, and Henrik Gahn, Upsala, Sweden, both exhibit Amykos, a cosmetic preparation for beautifying the skin, for cleaning the scalp and teeth, and for relieving headache by being snuffed up the nose.

Acqua di Felsina, a toilet water for beautifying the complexion, for cleaning the teeth, etc., Pietro Bartolotti, Bologna, Italy.

Perfumery, A. Lardera, Milan, Italy.

Perfumery, Patequazza Brothers, Rome, Italy.

Italian Essential Oils, Alessi Gaetano, Messina, Italy.

Italian Essential Oils, Alessi & Bonaventura, Messina, Italy.

Italian Essential Oils, Ottaviani Brothers, Messina, Italy.

Italian Essential Oils, Rizzuto Carmelo, Reggio, Calabria.

Italian Essential Oils, Di Sieto Brothers, Reggio, Calabria.

Italian Essential Oils, Ignazio Siles, Reggio, Calabria.

Italian Essential Oils, Felice Lacoria, Reggio Calabria.

Oil of Lemon, Œnological and Agrarian Society, Acireale, Sicily.

Italian Essential Oils, Guiseppe di P. de Nava, Reggio, Calabria.

Italian Essential Oils, Guiseppe Melissari, Florence.

Perfumery, Adolfo Mostardini, Florence.

Boiled Oil of Lemon, Baron di Floristallo, Pennise, Catania.

Soap, Oneto, Agostino & Co., Sampierdarena, Genoa.

Essences and Flavoring Extracts, His Highness Sidi Mohammed Essadok, Bey of Tunis, Tunis, Africa.

Flavoring Extracts and Perfumery, Leao & Alves, Brazil.

Essential Oils and Pharmaceutical Preparations, F. J. Lepage, Brazil.

Flavoring Extracts, Perfumery, Commission General for the National Exhibition, Brazil.

Soap, Piñero Aurello, Province of Buenos Ayres.

Soap, Miguel Lanieri, Province of Entre Rios.

Soap, José Iglesias, Province of Entre Rios.

Soap, Antonio Alric, Province of San Luis.

Perfumes, Diaz de la Vega, Celedonia, Valparaiso, Chili.

Oil of Flowers, Petron Panayote, Chio, Dardanelles.

Rose, Orange, Blossom Waters, Governor of Aleppo, Turkey.

Perfumery, Feizoulah, Constantinoplê.

Cedar and Orange Blossom Waters, Prévézé Selim Agha, Yanina, Turkey.

Mint and Rose Waters, Abdoullah Tahil, Hidjat.

Essential Oils of Orange Flower and Geranium, Ali Agha Bachkin, Tripoli.

S. J. Lyman, Montreal, Canada. Arctusine, or Canada Bear's Grease. Culexifuge, or Sportsman's Friend. This is a viscid oil, containing strong aromatics, and having the property of preventing the attacks of black flies, mosquitos, fleas, bedbugs, etc. It appears to be a useful preparation for promoting the comfort of amateur fishermen and hunters.

Phosphorous Soap, for destroying insects, worms, potato bugs, caterpillars, lice, and other articulates injurious to plants and trees. Its chief utility is stated to consist in giving vigor to vegetable life, and death to insect life. The manufacturer lays stress on the soap being an ingenious combination of free phosphorus and soap, in conjunction with several vegetable poisons. He claims to have overcome the danger of forming hydric phosphide on account of the action of the alkali of the soap on the phosphorus.

McKeone, Van Haagen & Co., Philadelphia, Pa. This firm have gone to considerable expense in properly displaying their fine Toilet Soaps in a suitable manner. They have erected a costly and elegant pavilion, arranged in the interior as a private office or reception room, while the whole exterior has been utilized as show cases for exhibiting their productions. Their assortment of fine soaps is very extensive, comprising 460 different styles, many of them comparing favorably with the finest English and French soaps. In the centre of the pavilion is a square pedestal of rose-colored soap, weighing 1400 pounds. This supports a column weighing 500 pounds, and composed of twenty-three different kinds of soap, of various colors. The soaps are broken up and then pressed in a mould by hydraulic pressure, making the column have a mottled appearance. There are two more of these 500-pound columns, one of Turkish bath soap, and the other of layers of ten different kinds of soap, in cakes of fifty pounds each. There are 34 kinds of family soaps in the Exhibition, the most prominent being the "Oriental Detersive," "Crown," "Finest," and "I. O. U." brands. Maize flour and oatmeal toilet soaps are exhibited. The former has corn-starch and the latter oatmeal worked in the soap. Scouring soaps for wool and silk manufacturers are another specialty exhibited by this firm. In the finer toilet soaps there is almost an endless variety, and some of them are very neatly and attractively packed for sale.

The firm claims to own and operate the best-appointed soap manufacturing works in the world. Their manufacturing capacity enables them to boil at one time 1,000,000 pounds of soaps. They deserve credit for manufacturing a pure white and mottled castile soap, made from genuine olive oil, imported by themselves for this special purpose.

Dr. Pierre, Paris, France. Hygienic preparations, comprising Tooth Wash, Cinchona Tooth Powder, Coral Tooth Powder, in various styles. Balsamic Vinegar, Toilet Water, Cologne Water, and Amber Lavender Extract.

Albert M. Todd, Nottawa, St. Joseph Co., Michigan. Pure Oil of Peppermint and Lozenges flavored therewith. In response to our circular, Mr. Todd has given the following description of the production of the oil in his State :

"My exhibit at the Exposition was the Natural Oil of Peppermint, of the first distillation, the cultivation and distillation of which is, in Michigan, a very important industry, especially in this (St. Joseph) county, which county alone produces annually about one-fifth or one-sixth of the entire amount produced in the world. The average annual crop of the world is, as near as I can estimate it, about ninety thousand (90,000) pounds of oil. Probably four-fifths of all the oil of peppermint produced is distilled in this country, a little being distilled in Southern England and Central Germany. The manner of cultivation is, briefly, as follows: It is set out in rows about 24 to 30 inches apart, in the early spring. For this purpose both the roots and creeping tendrils are used which have grown the preceding season, both of which sometimes attain a length of between three and four feet. These being separated one by one, are stretched along in the furrow and entirely covered with fresh earth.

"Cultivation commences as soon as the young shoots make their appearance above the ground. As the plant grows it sends forth branches and tendrils in every direction, the latter completely covering the ground. The average height reached by the plant is not far from two feet, although sometimes, under the most favorable circumstances, it attains a height of four feet, and even more.

"Distillation usually commences in August and is finished in September. If the preceding winter has been mild, so that the roots and tendrils are not killed by the frost, a second crop, and sometimes a third is obtained from the roots set out one and two years previous. This is called the 'old crop,' and as the tendrils throw down roots and send up shoots, the ground is entirely covered with the plant. This, as it has an earlier start in the spring, matures and is distilled before the new setting.

"The average crop per acre will not much exceed twenty pounds of oil, although with the most favorable conditions of soil, climate, etc., more than twice this amount has been produced.

"Distillation should commence when the plant begins to blossom.

"The herb being cut down should be allowed to lie in the hot sun for six hours, by which means the distillation is facilitated and the oil is obtained of a brighter color.

"The cured herb is then tightly packed in vats capable of holding about two thousand pounds each, and when they have been filled, a tight cover is fastened over them. Steam is then forced through the vats by means of an opening in the bottom. The globules of oil, which are contained in minute vesicles underneath the leaf, being expanded by the heat, burst forth from their cells and are carried off in the steam. This, after passing through the plants, is carried from an opening above into the worm, where it is finally condensed.

The condensed steam afterwards flows into a receiver, where the oil and water separate of their own accord. The specific gravity of the oil when pure, at 70° Fahr., is 916.

"The water which has separated itself from the oil is highly impregnated with the oil, and should be retained for reconversion into steam, as fresh water always absorbs a certain per cent. of oil. This being already fully charged would not, if used again, occasion further waste. Nevertheless, most of our distillers carelessly allow this distilled water to flow away and waste, at the rate of one thousand gallons of highly impregnated water daily, from each distillery. There being over one hundred distilleries in this country the waste is immense.

"Much of the oil is sold by the common distillers in bulk, and after being bought by the wholesalers is badly adulterated, and in this state it is then sold to the consumers.

"Our soil and climate in Michigan being favorable, the quality of our oil is unsurpassed. Our season being longer than in New York State, the plant is enabled to mature fully, and thus to produce the oil in all its perfection."

Royal Arnhem Cologne Water Manufactory, Arnhem, Holland.

D. Pappazoglou Brothers, Kezanlik, Turkey, pure Otto of Rose, in cans and bottles. This firm claims to be at present the sole exporters of otto of rose in Kezanlik. D. Pappazoglou has published a pamphlet, in which he gives an account of the cultivation of roses in Turkey, the quantity produced, and of the commerce in the otto. We make therefrom the following extracts:

"The rose tree is principally cultivated in European Turkey, in the southern part of Roumelia (ancient Thracia) situated at the foot of the Balkans.

"The rose tree requires a very sabulous and sloping ground, well exposed to the sun.

"The planting is done in spring and fall, in the following manner:

"Holes are dug in parallel lines, one-quarter of a yard deep and wide; the ditches one-half a yard distant from each other.

"Parts of an old rose tree are broken off and planted in the holes dug for the purpose, as described above, so as to form an uninterrupted line; they are then covered with earth mixed with manure.

"This operation being finished, if the ground be favored with rain, you may already perceive, after six months, some small branches coming forth from the trees you planted.

"Great care has to be taken of these offsprings. The ground all around them has to be carefully dug over, and then you may see the rose tree grow quite rapidly.

"At the end of the first year the rose tree reaches in height about ten inches, and at the end of the second year it will show some blossoms; in the third it already gives roses fit for production, and in the fifth year it has attained its full height, about five or six feet, and remains productive for ten years more. After that time you have to renew the whole process.

"The rose tree requires unceasing care; it is necessary to turn the ground four times during the year, and at least every year you must cover the roots with manure; such benefits the quantity, but harms the quality.

"The rose tree is not pruned like the vine, but you have to be careful and cut off all the dead branches which might have been produced by different causes.

"The rose tree is a very delicate plant, and is subject to the changes of the seasons. In cold winters the branches die, as it happened to the crop of the year 1870.

"Frost and fog are very dangerous to the tree, especially if they come while it is in bloom, and too warm a temperature is dangerous to the distillation.

"The crop takes place in May, and lasts about twenty days, when the distillation is also attended to.

"The gathering is done early in the morning, by taking off the flowers with the hand, without touching the buds.

"The next morning the same operation is continued on the same trees, and then every day till the whole crop is collected.

"The quality of the crop depends greatly on the temperature during the gathering, and very often a crop whose prospects before the gathering seemed large and excellent may turn out a very bad one after all.

"The flowers gathered while the sun is shining upon them are much inferior to those collected before sunrise; nor must the flowers lay long before being distilled, as they will then yield but very little essence.

"If the crop be not too large, the flowers are gathered every day before daybreak and immediately distilled; the apparatus for this purpose being at hand.

"By doing so the distillation will be an excellent one. It is very important to know how long it will take for all the flowers to be in full bloom, as in this way the cultivator can calculate how long it will take him to gather the whole crop. If the flowers take ten days to be in full bloom he will have to gather one-tenth every day; if it takes twenty days, one-twentieth every day.

"Should the crop be so large as not to permit the distilling on the same day of the gathering, the flowers left over for the next day will lose their perfume and yield but little oil.

"If during the gathering the temperature be cold and wet, the flowers will blossom very slowly, but should it be warm the sun will hasten their blooming. A good crop depends not only on the quantity of the flowers, but more especially on the weather being favorable for the distillation.

"The stills of the peasants are small and of the simplest construction.

"The production of the flowers varies, but on an average it requires three thousand pounds of flowers to produce one pound of otto of rose.

"The total production of otto of rose in the southern part of Roumelia is not larger than 3500 pounds.

"The rose tree is cultivated in the following districts, situated in the Sandjak of Philippopoli:

Késanlik, . .	1866	pounds.	Koyoun-Tépé, . .	112	pounds.
Tchirpan, . .	162	"	Zaara, . . .	99½	"
Gueupsa, . .	804	"	Jenni-Zaara, . .	115	"
Karadja-Dahg, .	349½	"	Pazardjik, . .	115	"

Total production, 3623 pounds.

"The most important district is unquestionably Késanlik.

"Each of the above districts is subdivided into a number of small villages, the production of each ranging from 2 to 154 pounds.

"The above total is about the yearly average production, but the crop sometimes reaches the total of 6600 pounds, as it did in 1866; and sometimes falls off to 1700 pounds as it did in 1872.

"This statement shows how varied the cultivation of the rose tree is, and how it is divided among so many villages and many hands.

"It is entirely in the hands of peasants and farmers, and each of them possesses also a still and a condensation-tube for the distilling of their roses.

"In order to get the otto of rose entirely pure and with some advantage, it must be bought of the farmers, and by advancing them money on their next crop, and so engaging all they produce.

"The few small merchants of Roumelia send their otto of rose to Constantinople and Andrianople, where they sell it to the foreign merchants, who export it to the countries where it is consumed.

"Since a few years ago our country has been in better communication, and in livelier business connection with other parts of Europe, and this induced us to offer our otto of rose *direct* to the consumers, and not to sell any more to the merchants of Constantinople.

"We thought this, and found it to be the greatest advantage to us, as we were entirely convinced that the extract suffered a great deal by adulteration in passing through so many hands."

Weeks & Potter, Boston, exhibit Ambergris in large dark masses. This is a solid, fatty inflammable substance, of a dull gray color, possessing a peculiar sweet earthy odor. It is a morbid secretion, found in the intestines of the sperm whale, and is sometimes found floating on the sea, on the seacoast, or in the sand on the seashore. It comes from the Atlantic Ocean, on the east coasts of Brazil and Madagascar, also the East Indies, China, Japan, and the Molucca Islands and the Bahama Islands. It is also sometimes found in the abdomen of whales, in lumps weighing from half an ounce to 100 pounds. It is used in perfumery. In minute quantities its alcoholic solution is used for giving a "floral" fragrance.

Quadruple Orange Flower Water, Domingo Forner Sales, Burriana, P. de Castellon, Spain.

Oil of Lemon and Citric Acid, Juan Rantista Canales, Malaga, Spain.

Sweet Almonds and Oil of Sweet Almonds, Francisco Fuster, Palma de Mallorca, Balearic Islands.

Oil of Juniper, Corps of Mountain Engineers, Lorma, Province of Burgos, Spain.

Walnut Oil, Count of Vega Grande, Las Palmas, Canaries.

Juniper Oil and Resin, Ambrosio Yaniz, Villar de Humo, Province of Cuenca, Spain.

Toilet Waters and Empress Cream, Eduardo Villalon, Madrid, Spain.

Augustin von Westernhagen, Manila, Philippine Islands, Essential Oil of Ylang Ylang, Essential Oil of Calpé, Triple Extract of Sampaguita, Concentrated Oils of Champacca and Sampaguita. This firm is said to be one of the chief manufacturers and exporters of Philippine Essential Oils and other drugs.

Essential Oil of Ylang Ylang, Oscar Reymann, Manila, Philippine Islands.

Andropogon Schœnanthus and Nardus, both dried. Mangostan and Dita Barks. Extract of Dita. D. Jacobo Zobel, Manila, Philippine Islands.

"Essencia de Malagueta," known with us as Oil of Ray. Butter of Cacao. Castor Oil. Celestino Domingues, Guayama, Porto Rico.

Joseph Bosisto, Richmond, Melbourne, Australia, a valuable collection of Pharmaceutical Preparations, chiefly obtained from the Eucalyptus trees of Australia. The entire exhibit has been generously presented to the Philadelphia College of Pharmacy:

Essential Oil of Eucalyptus citriodora, the sweet-scented gum. Essential Oil of Eucalyptus goniocalyx, the white gum tree. Essential Oil of Eucalyptus odorata. Essential Oil of Eucalyptus Stuartiana. Essential Oil of Eucalyptus globula. Essential Oil of Eucalyptus fissilis. Gum or Resin of Eucalyptus rostrat., the red gum of Victoria. Eucalyptol. Oil of Melaleuca ericifolia. Oil of Peppermint, cultivated in Victoria. Liquor Eucalypti globuli. Ointment of Eucalyptus. Gum of Xanthorrhœa australis, or grass tree. Powdered Eucalyptus Leaves. Murray Pine Gum. Pinus callitr.

Lavender Water, Cod-liver Oil and Iron, Phosphorated Cod-liver Oil, a variety of Pills and Chemicals. Hood & Co., Port Philip Chemical Works, Melbourne, Australia.

Indian Odontine, Powder of Jamaica, Gonina or Chestwick Powder, for the Teeth, Bisulphite of Lime. Charles Grant, Kingston, Jamaica.

Michaelis & Kaskel, New York. Fir-Wool Oil, distilled from the leaves of Pinus sylvestris. Flannels and Underclothing of Fir Wool, recommended as a remedy and preventive for rheumatism. The manufacture of these goods is one of the industries of the Black Forest in Germany.

F. A. Sarg, Son & Co., Liesing, near Vienna, Austria. A very extensive and well-arranged exhibit of Fancy Soaps, Vienna Glycerin, Paraffin, White and Yellow Ozokerite, and Liquid Glycerin Soap.

Franz Wilhelm & Co., Vienna, Austria. Essential Oils of German Chamomile, Valerian, Fennel, Coriander, Grapes, and many other. Also a valuable and well-selected collection of Austrian Drugs.

Calderara & Bankmann, Vienna, Austria. A handsome display of Transparent Glycerin and Fruit Soaps. Also Handkerchief Extracts and other perfumery.

Joh. Chr. Blœdner's Son, Gotha, Germany. Marvellously close imitation of Fruits, Sardines, Cheese, Jellies, and other eatables, all made out of Colored Soaps. Materials for the manufacture of Toilet Soaps in blocks and jars. Fine transparent Toilet Soaps; Miniature Soap and Perfumery; Toys of Soap; Refined Tallow.

Gustav Lohse, Berlin, Germany. Eau de Lys de Lohse, for beautifying the complexion. Milk of Lily Toilet Soap. Toilet Powders. Balsamic dentifrice. Nisaline Extract of Aromatic Herbs,* for preventing the hair from falling out. Although this perfumer claims to be furnisher to the Emperor, we failed to notice any attractive novelties in the styles of his goods, all of which appear to have been copied from French prototypes.

Gœdecke & Co., Leipsic, Germany. Twelve varieties of Flavoring Extracts and thirty-six of fine Essential Oils, of which we note the Oils of Lovage, Linaloe, Cummin, Marjoram, Hops, Galbanum, Angelica, Ginger, Dill, and Cascarilla.

Heinrich Hænsel, Pirna-on-the-Elbe, Saxony, Germany. Patented Essences, simple and concentrated. Rum, Arrac, and Cognac Essences. Liquid Spice Extracts for kitchen and domestic use. Essential Oils. Fruit Ethers. *Positiva* Essential Oils for flavoring liquors without producing any turbidity.

E. Sachsse & Co., Leipsic, Germany. A very beautifully arranged case of fine Essential Oils, many of them very rare and costly. Out of the forty-four exhibited we enumerate the Essential Oils of Rose, Caraway, Juniper Berries, White Santal Wood, German Melissa, Cedar Wood, German Garden Marjoram, Palma Rosa. Large and well-defined Crystals of the Oils of Thyme and Peppermint.

Friedrich Wolff & Son, Carlsruhe, Germany. Fine Toilet and Transparent Soaps. Preparations of Salicylic Acid for the toilet. Extracts and perfumed waters.

Kluge & Pœritzsch, Leipsic, Germany. A case containing seventy varieties of Essential Oils and Liquor Flavors. We note the Oils of Juniper Berries, Birch Tar, Curled Mint, and Angelica.

C. A. F. Kahlbaum, Berlin, Germany. A collection of fifty-four rare Organic Chemicals, chiefly derivatives of Alcohols. We mention the Acetates of Ethyl and Amyl; Absolute Ethylic Alcohol; Pure Methylic and Fatty Alcohols; Pure Acetic Acid; Artificial Oil of Mustard, obtained from Allyl Alcohol; Iodoform.

Dr. Wilhelm Haarmann, Holzminden-on-the-Weser, Germany. Artificial Vanillin, obtained from Coniferin. Vanillic Acid. Saccharated Vanillin. Solution of Vanillin in Glycerin. Though the manufacturer seems to be quite sanguine in his expectations, in recommending Vanillin as a substitute for Vanilla Bean, we cannot entirely coincide with him. While the odor of Vanillin approaches closely to that of the Bourbon bean, it does not appear to be identical with that of the far more precious Mexican *Vainilla de Papantla.*

Dr. F. v. Heyden, Dresden, Neustadt, Germany. Artificial Oil of Wintergreen, obtained from Salicylic Acid. Various preparations and derivatives of Salicylic Acid.

Dr. F. Wilhelmi, Reudnitz, Leipsic, Germany, discoverer and sole manufacturer of Artificial Oil of Bitter Almonds, chemically identical with the true oil. This is exhibited in very fine quality, without a trace of the coal-tar odor adhering to it. Also Benzoic Acid, Essence of Niobe, and Chloride of Benzyl.

Maximio Rio de la Loza, Mexico. Essential Oils of Linaloe, Jorongil, and Orange.

Augusto Morril, Mexico. Nut Oil.

J. L. Silvera, Papantla, Mexico. Fine Mexican Vanilla Beans.

José Bernardino Silvera, Papantla, Mexico. Fine Mexican Vanilla Beans.

Mattias Collado, Papantla, Mexico, Fine Mexican Vanilla Beans.

A. Fonticella, Papantla, Mexico. Gold Medal Vanilla Beans.

Auguste de Marbaix, Antwerp, Belgium. Anvers Toilet Water. Oil of Caraway Seed. Oils of Cedar and Cloves.

William Fresson, British Guiana. Laurel Oil from Oreodaphne opifera. Cayenne Oil from Capsicum annuum. Essence of Vanilla. Cassareep from Janipha manihot. Balsam Copaiba. Cocoanut Oil. Honey. Crab Oil from Carapa Guianensis. Bay Rum. Greenheart Seeds and Wood, one hundred years old. Carabisi Nutmegs. Castor Oil. Caraweera or Indian Red Paint. Wild Cucumber Seeds. Extensive assortment of Arrowroots and other Starches. Guinea Pepper, Amomum malagueta. Quassia or Coissi Wood.

VI. MISCELLANEOUS.

APPARATUS, APPLIANCES, ETC.

The exhibit of apparatus for the use of Pharmacists in ordinary practice was limited in extent, but there was an extensive collection of instruments of precision used in Chemistry, Metallurgy, and collateral sciences. Although impossible to give a complete and detailed list of everything connected with this department, we note the following as of interest to the members of the Association:

SCALES, BALANCES, ETC.

United States.

Henry Troemner, Philadelphia, a large display of Analytical, Assay, and Apothecaries' Prescription Balances, and Counter Scales, handsomely finished and mounted. We note sales to Germany, London, Chili, San Francisco, etc.

Becker & Sons, New York, Analytical Balances and Prescription Scales; new pattern of the latter with beams inclosed in a box below the pans, the whole covered with hinged glass lid, forming a protection from dust, etc.

Prescription and Counter Scales, Charles Reinhardt, Brooklyn, N. Y.

Eureka Balance, Self-adjusting Scales, etc., John Chattilon & Sons.

Counter Scales, Seamless Scoops, etc., F. Meyer.

John C. Dell, Philadelphia, the Buffalo Scale Company, Fairbanks, and Riehle made large displays of scales for commercial purposes.

Automatic Balance Scale, Henry M. Weaver, Mansfield, Ohio.

France.

B. Trayvou, Paris. Quite a large display of Counter Scales of the Beranger pattern, the beams inclosed in marble or wooden boxes, and only the pans exposed. Many of these were purchased by American pharmacists.

Alvergniat Bros. and Chameroy & Co., of Paris, also displayed Balances of different styles.

Deleuil, of Paris, exhibited Instruments of Precision, Balances, etc., showing magnificent workmanship.

Scales, Gold and Silver Precision Balances, Joseph Florenz, Vienna.

Balances were also exhibited in the departments of Brazil, Mexico, Turkey, Switzerland, and Germany. The Short-Arm Balance of F. Sartorius, Gottingen, demanded attention on account of novelty in this country.

Pulse Pump Apparatus, adapted for accelerating the filtering process, Nicholas Jagn, St. Petersburg, Russia.

Polaristrobometers, Hair-Hygrometers, etc., Herman Pfister, Berne, Switzerland.

Lenoir & Forster, of Vienna, made a good display of Chemical, Physical, and Mineralogical Apparatus, for analysis, blowpipe work, etc.; Air-tight Percolators, Wolff Bottles, and other laboratory ware. Many articles were purchased for the University of Pennsylvania.

Alois Kreidl, Prague, displayed Chemical and Physical Apparatus for Schools, etc.

G. A. Schultze, Berlin, exhibited Thermometers, Hydrometers, Carbonic Acid Apparatus, Saccharometers, and Hygrometers.

Negretti & Zambra, London, were conspicuous for the large and valuable collection of Hygrometers, Barometers, Deep-sea and other Thermometers, and a patented Hydrometer, with strengthened bulb and stem to lessen the danger of fracture.

J. J. Hicks, London, also exhibited instruments of precision, including Clinical Thermometers, graduated to $\frac{1}{50}$th degree; Crooke's Radiometers, Hourly Recording Barometers, all of superior workmanship.

The United States was well represented in this branch of industry.

W. H. Pile & Son, Philadelphia, exhibited their well-known Hydrometers, Specific Gravity Bottles, etc.

E. B. Benjamin, New York, displayed Chemical and Assaying Instruments, Tools for blowpiping, Geissler Tubes, Students' Sets, etc.

Guiseppe Tagliabue, New York, Recording Barometers, Rain Gauge, Pyrometers, Hydrometers, Milk Tester, etc.

Bahmann Bros., New York, Thermometers, Hydrometers, and Chemical Glassware.

James W. Queen & Co., Philadelphia, Thermometers, Hydrometers, Microscopes, and instruments for students and professional men.

Charles Wilder, Peterboro, N. H.; N. Muller's Sons, New York, Thermometers.

A. Schlotterbeck, Portland, Me., Thermometers.

P. J. McElroy, East Cambridge, Mass., patent Excelsior Glass Syringes, without caps or corks, with rubber washer on piston to prevent breakage. Rubber Bulb Syringes, with four *glass* pipes instead of metal.

Atomizers, or Spray Producers, were exhibited by the Essex Manufacturing Co., Newport, R. I.; Young, Ladd & Coffin, New York; Codman & Shurtleff, Boston; Isaac P. Leete, Branford, Conn.

PHARMACEUTICAL APPARATUS.

F. A. Wolff & Sons, Heilbron, Germany, exhibited a Heating Apparatus, for distilling, evaporating, digesting, making infusions, etc., with condensing worm attached; and also Clockwork Stirrer, for evaporating extracts, etc. Also, a smaller apparatus, for similar purposes, and one for distillation only, for schools, perfumers, etc. Information given by E. Herwig, Third and Brown Streets, Philadelphia.

Drug Mills were exhibited by Hance Bros. & White, H. Troemner, and the Enterprise Manufacturing Co., all of Philadelphia, the merits of which were discussed in our last Annual Report.

Providence Gas Burner Co., Providence, R. I., exhibited Gas Stoves.

Burnham & Co., Philadelphia, exhibited Gas Stoves.

Barrows, Savery & Co., of Philadelphia, displayed Enamelled Hollow-ware.

Lalange & Grosjean, of New York, exhibited, Granite-lined Dishes, without seams. The collection contained many vessels of use to pharmacists. The granite ware is said to resist a high heat without peeling off.

J. Bishop, of Sugartown, Chester county, Pa., exhibited Platina Crucibles and other vessels of this material in great numbers. They were creditable specimens of home production.

The Keller Manufacturing Co., Harrisburg, Pa., displayed a very convenient Tin Measure, stamped out of one piece, and graduated to quarter pint, half pint, one pint, one quart, and dry quart, all in one, called Coover's Graduated Measure.

James W. Tufts, Boston, Mass., exhibited Arctic Soda Water apparatus. Large sums of money were expended in constructing apparatus for the Exhibition, and the dispensing of soda water in all of the buildings in such enormous quantities was a feature never before witnessed at any similar exposition. The points of superiority claimed by this maker are, First. The marble used in their construction is of the finest quality. Second. Elegance of design in architectural display. Third. Thoroughness of workmanship and durability. Fourth. The design of the Arctic Cooler gives great surface in small space, producing the greatest possible degree of cold with the smallest consumption of ice.

Charles Lippincott & Co., Philadelphia, had an equal number of stands for the dispensing of soda water. The variety in design, the size of the various apparatus, and the large number exhibited impress the observer with the extent and magnitude of this business. This firm divide the honors with the

Boston house, and claim the following points of excellence. First. Facility in drawing and dispensing soda water. Second. Superior capacity for cooling both soda water and syrups. Third. Ease of access in supplying ice and syrups. Fourth. Excellence of workmanship. Fifth. Simplicity of construction.

John Matthews & Co., New York, displayed several styles of their apparatus, but did not have any in operation. Those which were shown, however, were unique and beautiful.

Of stoneware for manufacturing chemists there were extensive displays.

Richard C. Remmey, of Philadelphia, exhibited receivers for making Muriatic and Nitric Acids, from 30 to 50 gallons; pots for cooling and mixing acids, 12 to 30 gallons; condensing worms, elbows, sleeves, strainers, dippers, and evaporating pans for acids; photographers' boxes, 1 to 7 gallons; spiggots, funnels, and pitchers with good pour-out lips and handles; ammonia jars, etc. He claims that his ware is acid proof throughout, and that it does not depend on the glazing merely, and that it bears changes of temperature better than other makes. He also makes evaporating dishes (similar in appearance to Berlin porcelain) which stand changes in temperature without fracture admirably.

Doulton & Watts, Lambeth Pottery, London, took the lead among the English manufacturers of chemical ware. Their exhibit included huge jars for storing acids, retorts with head, dip-arm and worm, receivers with connecting pipes and cocks, chlorine gas retort, still-heads, condensing worms, evaporating dishes, jugs, funnels, etc. Also, stoneware percolators and receivers, infusion jugs, extract pots, air-tight covered jars with iron clamps, etc. The artistic shape and finish of these goods formed a marked feature of the display. Their acid pump, with valves, pistons, cylinders, etc., all of stoneware, is a triumph of the ceramic art.

James Stiff & Sons, Lambeth, London, made a good display of Chemical Stoneware.

The gem of this exhibit was a model of a Distillatory Apparatus in stoneware, consisting of retorts, stand, three receivers with taps ground in, round jars, store jars, worms, still-heads, dip-arms, false arms, and connecting pipes. These were beautifully made specimens of the ceramic art. There were also Stoneware Clocks, Jars, Flanged Pipes, Acid Pipes, etc. Two kinds of ware are exhibited by this firm, the Brown or Salt-glazed Ware, being the more intensely vitrified and so better adapted for strong acids and exceedingly volatile chemicals; while the second or White Stoneware, which is unglazed on the outside and coated on the inside with a feldspar glaze, is more suitable to a very high temperature and resisting alternations of heat and cold. This ware, therefore, is more generally suitable for retorts. These goods are made of the best clays of the Devonshire and Dorsetshire districts, together with a small percentage of Stourbridge clay, and two other materials, intended to improve the temper of the ware.

Bates, Walker & Co., Dale Hall Works, Burslem, England, displayed

Whiteware, Mortars, Infusion Mugs, Funnels, Pill Tiles, Leech Jars, Photographers' Dishes, etc.

J. & C. Price & Brothers, Bristol, England, also exhibited Stone Bottles, Water Filters, and Feet Warmers.

Large collections of Crucibles were displayed by Robert Taylor & Co., Philadelphia; Dixon Crucible Company, Jersey City, N. J.; Patent Plumbago Crucible Company, London.

Glassware, Whitall, Tatum & Co., Philadelphia. The especial claims for this Glassware are freedom from lead, uniformity of weight, even distribution of the glass, and exact finish of the mouth and lips. A general line of Chemical Glassware, which they state will resist heat better than the imported glass. One hundred and ten varieties of Reagent Bottles, with the symbols blown in the glass.

Glassware, H. C. Fox & Sons, Philadelphia. The points to which attention is particularly drawn in this exhibit are: First, the superior color and quality of the glass; second, the similarity of the weight and correctness of the contents of the bottles; third, the superiority of the Lettered Ware, particularly the distinctness of the lettering. The process by which this effect is obtained was introduced by this house in 1874, and consists essentially in providing a means of escape for the cushion of compressed air collected in the letters sunk in the mould when the glass is forcibly introduced, and which in the old way always prevented the melted glass from thoroughly filling out the letters in the mould.

Drug Dispensing Bottles, William R. Warner & Co., Philadelphia.

Glassware, Whitney Brothers, Glassboro, N. J.

Glassware, Boston and Sandwich Company, Boston, Mass. Beautiful display of this brilliant glass.

Glassware, New England Glass Company, East Cambridge, Mass. Very transparent and brilliant glass.

Glassware, William Holzer, Philadelphia. A general display of chemical and philosophical glassware.

Perfume Atomizers, Young, Ladd & Coffin, New York.

Soda-lime Glassware, J. H. Hobbs, Brockunier & Co., Wheeling, W. Va.

Glassware, Bakewell, Pears & Co., Pittsburg, Pa.

Franz Batka, Prague, Austria. A complete assortment of Chemical Glassware: Evaporating Dishes, Gas Bottles, Arsenic Tubes, Beaker Glasses, Cylinders in various shapes, Test Tubes, Desiccating Flasks, Wolff's Bottles, Bell Glasses, Stop-cocks, Vial-mouthed Flasks, Bulbs, Retorts and Receivers, Combustion-Tubes, Spoons, Spatulas, Washing Bottles, Funnel Adapters, etc., etc. The shop-furniture bottles, although beautifully cut, are not of the shape now popular in America. An interesting feature is what is known as the Hyalith Glass. This is an opaque glassware, of a beautiful black color, which completely excludes the light from all salts contained in them. No lead whatever is used in this glassware.

Royal Porcelain Manufactory, Berlin, Prussia. A magnificent collection of their celebrated Chemicals and Pharmaceutical Ware, consisting of Porcelain Retorts, Stills, Alembics, Mercurial Pneumatic Troughs, Mortars and Pestles, Spirit Lamps, Measures, Medicine Spoons, Dippers, Evaporating Dishes, Crucibles, Funnels, Funnel Supports, Desiccating Apparatus, etc., etc.

Patent Plumbago Crucible Company, London. This company had a remarkably fine display of Crucibles, Furnaces, etc., made with a care and attention to detail not usually seen.

Doulton & Co., London. This firm exhibited Iron-bound Melting, Muffle, and Evaporating Furnaces.

Druggists' Goods, T. C. Brown, Westhead, Cauldon Place; Moore & Co., Staffordshire Potteries.

Glass Bottles, Aire & Calder Glass Bottle Company, London.

Druggists' Sundries, Surgical Instruments, Lynch & Co., London.

Surgical Appliances, Glasgow Apothecaries' Company, Glasgow, Scotland.

Disinfector, Robert James Lee, London.

Glass Bottles, Gledhill, Melbourne.

Glassware, Mount & Co., Emerald Hill, Victoria.

Crucibles and Jars for Ointments, Joh. Gundlach, Jr., Grossalmerode, Germany.

Artificial Human Eyes, L. Müller, Lauscha, Germany.

Bandages, F. Esmarch, Kiel, Germany.

Medical Dressings, P. Hartmann, Heidenheim, Germany.

Plan of apparatus for making Sulphuric Acid, A. de Hemptinne & Son, St. Jean, near Brussels.

Apparatus for Dressing Wounds, Hippolyte Gullery, Brussels.

Model of Ambulance Bag, Emile Hermant, Bruges.

Atomizer and Vaporizer, Isaac P. Leete, Branford, Conn.

Thermometers, Nicholas Muller's Sons, New York.

Chemical and Porcelain Wares, etc., E. B. Benjamin, New York.

Hydrometers and Chemical Glass Instruments, Bahmann Brothers, New York.

Thermometer, A. S. Schlotterbeck, Portland, Maine.

Hygienic Chairs. Charles M. O'Hara, Philadelphia.

Medicine Chest, Alfred A. Gilbert, Philadelphia.

Anatomical Preparations of Human Eye and Ear, H. W. Hechelman, Alleghany City, Pa.

Auscultatory Percussor for Diagnosing, Louis Livingstone Seaman, New York.

Surgical and Anatomical Specimens of Tumors, H. D. Lonaker, Allentown, Pa.

Invalid Beds and Chairs of approved make, T. McIlroy, New York.

Surgical Instruments, Shepard & Dudley, New York.

Surgical Instruments, George Tieman & Co., 67 Chatham Street, New York.

Artificial Limbs, James A. Foster, Philadelphia.

Artificial Limbs, B. Frank Palmer, Philadelphia.

Hard Rubber Truss, etc., J. B. Seeley, Philadelphia.

Glass and Family Syringes, Medicine Droppers, etc., P. J. McElroy, East Cambridge, Mass.

Surgical Apparatus, Crutches, Chairs, etc., Allen & Johnson, Philadelphia.

Trusses, Supporters, etc., Philadelphia Truss Company, Philadelphia. The merits claimed by this company are simplicity, lightness, and durability.

Surgical Instruments, J. J. Teufel, Philadelphia.

Surgical Instruments, Codman & Shurtleff, Boston, Mass.

Surgical Dressings. The International Bandage Factory, Schaffhausen, Switzerland. Lint and Medicated Bandages are shown in the greatest variety by this company, and great care and neatness are manifest from inspection of their display.

Artificial Limbs, William Blanck & Son, Philadelphia.

Surgical Instruments, M. Leiner, New York.

Easy Chair, Invalid Bed and Fracture Apparatus combined, Isaac M. Rhodes, Hancock, Mich.

Artificial Limbs, Richard Clement, Philadelphia.

Trusses and Supporters, W. H. Horn & Brother, Philadelphia.

Wheel Crutch, etc., S. A. Darrach, Newark, N J.

Lever and Shield Trusses, John Goodier, Philadelphia.

Crutches, Charles Crandall, New York.

Artificial Limbs, Wickett & Bradley, New York.

Surgical Appliances, Hinkle & Mayon, San Francisco.

Crutches, August Bickel & Son, Philadelphia.

Surgical and Orthopedical Instruments, D. W. Kolbe, Philadelphia.

Truss and Supporter, Triumph Truss Co., New York.

Surgical Instruments, Horatio G. Kern, Philadelphia.

Plaster-Spreading Machines, William G. Newbauer, Long Island City.

Apparatus for the Treatment of Spinal Curvatures, Benjamin Lee, Philadelphia.

Leg and Thigh Splint, J. T. Woods, Toledo, O.

Porous Splints, David Ahl, Newville, Pa.

Surgical Instruments, George P. Pilling, Philadelphia.

Gynæcological Apparatus, S. P. Mervine, Jr., Philadelphia.

Surgical Apparatus, J. H. Gemrig, Philadelphia.

Elastic Bandages for surgical purposes, Vincent Perry, Germantown, Pa.

Surgical Appliances, Splints, Chairs, Crutches, Trusses, etc., National Surgical Institute, Indianapolis, Ind.

Trusses, E. C. Penfield & Co., Philadelphia.

Trusses, Elastic Truss Co., New York.

In concluding this part of the report, the committee would express their obligations to many of the exhibitors for the full accounts of their displays which were sent, and regret that want of space prevented giving more detail than has been given. Many answers to the circular letter continue to come in, even at the present time. It is the intention to issue a supplementary report, which will be presented at the next meeting, in which will be noticed parts of the information received too late for insertion in the present report.

Respectfully submitted,
JOSEPH P. REMINGTON, *Chairman.*
A. W. MILLER, M.D.,
JAMES T. SHINN,
J. F. JUDGE,
WILLIAM SAUNDERS,
S. P. SHARPLES,
A. P. SHARP,
JOHN F. HANCOCK,
EMLEN PAINTER.

Twelfth Month 12th, 1876.

LIST OF PUBLICATIONS RECEIVED,

For the American Pharmaceutical Association.

Societies and editors are respectfully requested to forward all publications intended for the American Pharmaceutical Association to the Permanent Secretary. European exchanges, if not sent by mail, will reach us through the Smithsonian Institution at Washington.

JOHN M. MAISCH,
145 North Tenth Street, Philadelphia, Pa.

American Journal of Medical Sciences, Philadelphia, 1876.
Medical News and Library, Philadelphia, 1876.
Dental Cosmos, Philadelphia, 1876.
The Laboratory, Boston, June, 1876.
Review of Medicine and Pharmacy, Detroit, 1876.
The Pharmacist, Chicago, 1876.
Pacific Medical and Surgical Journal, San Francisco, 1876.
The Canadian Pharmaceutical Journal. Edited by E. B. Shuttleworth, 1876.
Pharmaceutical Journal and Transactions, London, October, 1875, to September, 1876.
The Chemist and Druggist, London, 1876.
The Chemists' and Druggists' Diary, 1877.
Bulletin de la Société Royale de Pharmacie de Bruxelles, 1876.
Buchner's Neues Repertorium, München.
Pharmaceutische Zeitschrift für Russland, 1874, complete; 1875, Nos. 1–3, 10–15, 23; 1876, Nos. 13, 14.
Sitzungsberichte der K. Bayer. Akademie der Wissenschaften, 1875, 1, 2.
Ueber den Einfluss des Freiherrn Justus von Liebig auf die Entwicklung der reinen Chemie. Von Dr. Emil Erlenmeyer, 1874.
Ueber die Beziehungen der Chemie zur Rechtspflege. Von Dr. L. A. Buchner, 1875.
Almanach der K. Bayer. Akademie der Wissenschaften, 1875.
Nachrichten von der K. Gesellschaft der Wissenschaften, etc. Göttingen, 1875.
Pharmaceutische Centralhalle, Berlin, 1876.
Archiv der Pharmacie, Halle, 1876.
Zeitschrift des allgemeinen oesterreichischen Apotheker-Vereines. Wien, 1876.
Anzeiger der K. Akademie der Wissenschaften. Wien, 1876.
Schweizerische Wochenschrift für Pharmacie, 1876.
Proceedings of the American Academy of Arts and Sciences, Boston, xi.
Proceedings of the Philosophical Society of Glasgow, vol. x, No. 1.
Transactions of the New Hampshire Medical Society, 1876. Eighty-sixth anniversary. G. P. Conn, M.D., Secretary, Concord.

Transactions of the College of Physicians of Philadelphia, third series, vol. ii, 1876.

Transactions of the Illinois State Medical Society, 1875. Twenty-fifth annual session. T. D. Fitch, M.D., Secretary, Chicago.

Transactions of the South Carolina Medical Association, 1876. Eighth annual session. H. D. Fraser, M.D., Secretary, Charleston.

Transactions of the Minnesota State Medical Society, 1875.

Annual Report of the Mercantile Library Company of Philadelphia, January, 1876.

Annual Report of the Trustees of the Astor Library Company of the City of New York, January, 1876.

Catalogue of Officers and Students of Trinity College, 1876.

Medical and Surgical History of the War of the Rebellion, ii, 1876.

Pharmacopœæ Helvetiæ Supplementum, 1876.

AUTHORIZED AGENTS OF THE AMERICAN PHARMACEUTICAL ASSOCIATION.

Nominated by the Treasurer and Permanent Secretary, and approved by the President, to carry out the resolution passed at the fifth session of the 18th Annual Meeting.

California,	James G. Steele, 521 Montgomery St.,	San Francisco.
Dist. of Columbia,	John Alex. Milburn,	Washington.
Delaware,	Linton Smith, M.D., 7th & Market Sts.,	Wilmington.
Illinois,	Henry W. Fuller, 24 Market St.,	Chicago.
Kansas,	Robert J. Brown, Fifth & Shawnee Sts.,	Leavenworth.
Kentucky,	C. Lewis Diehl, First & Walnut Sts.,	Louisville.
Maryland,	J. Faris Moore, Howard & Madison Sts.,	Baltimore.
Massachusetts,	Samuel M. Colcord, Tremont Street,	Boston.
Michigan,	William Johnston, 153 Jefferson Av.,	Detroit.
Missouri,	William H. Crawford, 732 Washington Av.,	St. Louis.
New Jersey,	Charles B. Smith, 831 Broad St.,	Newark.
New York,	Daniel C. Robins, 91 Fulton St.,	New York.
	George C. Close, Smith & Schermerhorn,	Brooklyn.
Ohio,	Alfred C. Hill, Fourth & Smith Sts.,	Cincinnati.
Pennsylvania,	Rich'd M. Shoemaker, Fourth & Race Sts.,	Philadelphia.
	James B. Cherry, 23 Fourth Av.,	Pittsburg.
South Carolina,	Gustavus J. Luhn,	Charleston.
Tennessee,	James S. Robinson, 2d & Madison Sts.,	Memphis.
Virginia,	T. Roberts Baker, Main Street,	Richmond.

LIST OF SOCIETIES, LIBRARIES, JOURNALS, AND INDIVIDUALS,

To whom complimentary copies of the Proceedings of this Association are forwarded.

The State Libraries of all the States of the Union except Connecticut.

Maine Pharmaceutical Association,	Portland,	Maine.
Bowdoin College,	Brunswick,	"
Dartmouth College,	Hanover,	New Hampshire.
New Hampshire Medical Society, Dr. G. P. Conn, Secretary,	Concord,	"
Amherst College,	Amherst,	Massachusetts.
Harvard University,	Cambridge,	"
Massachusetts College of Pharmacy,	Boston,	"
American Academy of Arts and Sciences,	"	"
City Library,	"	"
City Hospital,	"	"
Boston Athenæum,	"	"
Vermont Pharm. Ass'n, A. W. Higgins, Sec.,	Rutland,	Vermont.
University of Vermont,	Burlington,	"
Brown University,	Providence,	Rhode Island.
Trinity College,	Hartford,	Connecticut.
Yale College,	New Haven,	"
College of Pharmacy of the City of N. Y.,	New York,	New York.
Literary and Scientific Society of German Apothecaries,	"	"
American Druggists' Circular,	"	"
American Chemist,	"	"
Oil Paint and Drug Reporter,	"	"
Astor Library,	"	"
Mercantile Library,	"	"
Long Island Historical Society,	Brooklyn,	"
Camden Pharmaceutical Association,	Camden,	New Jersey.
Philadelphia College of Pharmacy,	Philadelphia,	Pennsylvania.
College of Physicians,	"	"
Pennsylvania Hospital,	"	"
Academy of Natural Sciences,	"	"
American Philosophical Society,	"	"
Philadelphia Library,	"	"
Mercantile Library,	"	"
American Journal of Medical Sciences,	"	"

Dental Cosmos,	Philadelphia,	Pennsylvania.
Maryland College of Pharmacy,	Baltimore,	Maryland.
University of Maryland,	“	“
Maryland Academy of Sciences,	“	“
Smithsonian Institution,	Washington,	Dist. Columbia.
Congressional Library,	“	“
Surgeon-General, U. S. Army,	“	“
Department of Agriculture,	“	“
National College of Pharmacy,	“	“
Richmond Pharmaceutical Association,	Richmond,	Virginia.
Med. Soc. of Virginia, L. B. Edwards, M.D., Secretary,	“	“
South Carolina Medical Association, Dr. H. D. Fraser, Secretary,	Charleston,	South Carolina.
Tennessee College of Pharmacy,	Nashville,	Tennessee.
Louisville College of Pharmacy,	Louisville,	Kentucky.
Cincinnati College of Pharmacy,	Cincinnati,	Ohio.
Cincinnati Academy of Medicine,	“	“
Longview Asylum,	Carthage, Hamilton Co., O.	
Detroit Review of Medicine and Pharmacy,	Detroit,	Michigan.
University of Michigan,	Ann Arbor,	“
Chicago College of Pharmacy,	Chicago,	Illinois.
Illinois State Medical Society,	“	“
St. Clair Pharmaceutical Association of Southern Illinois,	Belleville,	“
St. Louis College of Pharmacy,	St. Louis,	Missouri.
St. Louis Academy of Science,	“	“
St. Louis Mercantile Library,	“	“
St. Louis Public School Library,	“	“
Kansas State University,	Lawrence,	Kansas.
California Pharmaceutical Society,	San Francisco,	California.
Pacific Medical and Surgical Journal,	“	“
Montreal Chemists' Association,	Montreal,	Canada.
Canadian Pharmaceutical Society,	Toronto,	“

Pharmaceutical Association of Quebec.
British Pharmaceutical Conference, Dr. J. Attfield, London.
Pharmaceutical Society of Great Britain.
Pharmaceutical Journal and Transactions, London.
Chemical News, London.
Chemist and Druggist, London.
Journal of Applied Science, London.
British Museum, London.
Philosophical Society, Glasgow.
Liverpool Chemists' Association.
Association of Chemists and Druggists, Wolverhampton.
Pharmaceutical Society at Edinburgh.
Académie Royale de Médecine, Bruxelles.
Société de Pharmacie Royale de Bruxelles.

Société Royale des Sciences Médicales Naturelles, Bruxelles.
Société de Pharmacie d'Anvers.
Société de Pharmacie, Paris.
Académie des Sciences, Paris.
L'Union Pharmaceutique.
Répertoire de Pharmacie, Paris.
Schweizerische Wochenschrift für Pharmacie, C. W. Stein, St. Gallen.
Oesterreichischer Apotheker-Verein, Wien.
Oesterreichische Zeitschrift für Pharmacie, Wien.
K. Gesellschaft der Aerzte, Dr. Hauke, Secretary, Wien.
K. Akademie der Wissenschaften, Wien.
K. Bayer. " " München.
Neues Repertorium für Pharmacie, Prof. Buchner, München.
University of Strassburg.
Deutscher Apotheker-Verein.
Archiv der Pharmacie, Waisenhausbuchhandlung, Halle.
Chemisches Centralblatt, Dr. Rud. Arendt, Leipzig.
Prof. Dr. Wiggers, Göttingen.
Prof. Dr. Wöhler, Göttingen.
K. Akademie der Wissenschaften, Göttingen.
Pharmaceutische Centralhalle, Dr. H. Hager, Pulvermühle bei Fürstenberg.
Pharmaceutische Zeitung, Bunzlau.
Pharmaceutische Gesellschaft in St. Petersburg, St. Petersburg.
Pharmaceutisches Institut, Dorpat, Russia.
Pharmaceutical Institution, Stockholm, Sweden.
Kongelige Norske Universitet i Christiani.
Archiv for Pharmaci, S. M. Trier, Kjobenhavn.
Centro Pharmaceutico Portuguez, Porto, Portugal.

CONSTITUTION AND BY-LAWS

OF THE

AMERICAN PHARMACEUTICAL ASSOCIATION.

CONSTITUTION.

ARTICLE I. This Association shall be called the "American Pharmaceutical Association." Its aim shall be to unite the educated and reputable Pharmaceutists and Druggists of the United States in the following objects:

1. To improve and regulate the drug market, by preventing the importation of inferior, adulterated, or deteriorated drugs, and by detecting and exposing home adulteration.

2. To encourage proper relations between Druggists, Pharmaceutists, Physicians, and the people at large, which shall promote the public welfare, and tend to mutual strength and advantage.

3. To improve the science and art of Pharmacy by diffusing scientific knowledge among Apothecaries and Druggists, fostering pharmaceutical literature, developing talent, stimulating discovery and invention, and encouraging home production and manufacture in the several departments of the drug business.

4. To regulate the system of apprenticeship and employment, so as to prevent, as far as practicable, the evils flowing from deficient training in the responsible duties of preparing, dispensing, and selling medicines.

5. To suppress empiricism, and to restrict the dispensing and sale of medicines to regularly educated Druggists and Apothecaries.

6. To uphold standards of authority in the Education, Theory, and Practice of Pharmacy.

7. To create and maintain a standard of professional honesty equal to the amount of our professional knowledge, with a view to the highest good and greatest protection to the public.

ARTICLE II. This Association shall consist of active, life, and honorary members, and shall hold its meetings annually.

ARTICLE III. The officers of the Association shall be a President, three Vice-Presidents, a Permanent Secretary, a Local Secretary, a Treasurer, and a Reporter on the Progress of Pharmacy, all of whom, with the exception of the Permanent Secretary, shall be elected annually, and shall hold office until an election of successors.

ARTICLE IV. All moneys received from life membership, together with such funds as may be bequeathed, or otherwise donated to the Association, shall be invested by the Treasurer in United States Government or State securities, the annual interest of which only shall be used by the Association for its current expenses.

ARTICLE V. Every proposition to alter or amend this Constitution shall be submitted in writing, and may be balloted for at the next Annual Meeting; when, upon receiving the votes of three-fourths of the members present, it shall become a part of this Constitution.

BY-LAWS.

CHAPTER I.

Of the President and Vice-Presidents.

ARTICLE I. The President shall preside at all meetings of the Association; in his absence or inability, one of the Vice-Presidents, or in the absence of all, a President pro tempore shall perform the duties of President.

ARTICLE II. In the absence of the Permanent Secretary, the President shall appoint a Recording Secretary pro tempore.

ARTICLE III. In meetings the President shall take the chair at the proper time; announce all business; receive all proper motions, resolutions, reports, and communications, and order the vote upon all proper questions at the proper time.

ARTICLE IV. In all ballotings, and on questions upon which the yeas and nays are taken, the President is required to vote, but his name should be called last; in other cases he shall not vote, unless the members be equally divided, or unless his vote, if given to the minority, will make the decision equal, and in case of such equal division the motion is lost.

ARTICLE V. He shall enforce order and decorum; it is his duty to hear all that is spoken in debate, and in case of personality or impropriety he shall promptly call the speaker to order. He shall decide all questions of order, subject to the right of appeal, unless in cases where he prefers to submit the matter to the meeting; decide promptly who is to speak when two or more members rise at the same moment; and be careful to see that business is brought forward in proper order.

ARTICLE VI. He shall have the right to call a member to the chair, in order that he may take the floor, in debate. He shall see that the Constitution and By-laws are properly enforced.

Article VII. He shall appoint all committees, unless provided for in the By-laws, or otherwise directed by the Association.

Article VIII. He shall sign the certificates of membership, and countersign all orders on the Treasurer. He shall obey the instructions of the Association, and authenticate by his signature, when necessary, its proceedings.

Article IX. He shall present at each annual meeting an address, embodying general scientific facts and events of the year, or discuss such scientific questions as may to him seem suitable to the occasion.

CHAPTER II.

Of the Permanent Secretary.

Article I. The Permanent Secretary shall be elected to hold office permanently, during the pleasure of the Association. He shall receive from the Treasurer an annual salary of $600, and the amount of his expenses incident to the meeting in addition to his salary.

Article II. He shall preserve fair and correct minutes of the proceedings of the meetings, and carefully preserve, on file, all reports, essays, and papers of every description received by the Association, and shall be charged with the necessary foreign and scientific correspondence, and with editing, publishing, and distributing the Proceedings of the Association, under the direction of the Executive Committee.

Article III. He shall read all papers handed him by the President for that purpose; shall call and record the yeas and nays whenever they are required to be called; shall notify the chairman of every special committee of his appointment, giving him a list of his colleagues, and stating the business upon which the committee is to act; and shall notify every member of the time and place of each annual meeting.

Article IV. He shall be, ex-officio, a member of the Executive Committee.

CHAPTER III.

Of the Local Secretary.

Article I. The Local Secretary shall be elected annually, near the close of the Annual Meeting, and shall reside at or near the place where the next Annual Meeting of the Association is to be held.

Article II. He shall assist the Permanent Secretary in his duties; shall co-operate with any local committee in making arrangements for the Annual Meeting; shall correspond with the chairman of the several committees, and with other members, in advance of the meeting, for the promotion of its objects, and shall have the custody of specimens, papers, and apparatus destined for use or exhibition at the meetings.

CHAPTER IV.

Of the Treasurer.

ARTICLE I. The Treasurer shall collect and take charge of the funds of the Association, and shall hold, sign, and issue the certificates of membership.

ARTICLE II. He shall pay no money except on the order of the Secretary, countersigned by the President, and accompanied by the proper vouchers.

ARTICLE III. He shall report to the Executive Committee, previous to each Annual Meeting, the names of such members as have failed to pay their annual contributions for three years, and also the names of such as have failed to return their certificates of membership after having been officially disconnected with the Association, and having been duly notified to return them.

ARTICLE IV. He shall present a statement of his accounts at each Annual Meeting, that they may be audited; he shall receive an annual salary of $400, and the amount of his expenses incident to the meeting in addition to his salary.

CHAPTER V.

Of the Reporter on the Progress of Pharmacy.

ARTICLE I. The Reporter on the Progress of Pharmacy shall be elected annually, and shall receive from the Treasurer for his services such sum as may be annually determined upon.

ARTICLE II. All journals and volumes received in exchange for the Proceedings by the Permanent Secretary, and such other journals as shall be deemed necessary, shall be sent to him by that officer for use in the compilation of his report; for all of which he shall be held responsible until returned to the Permanent Secretary for preservation.

ARTICLE III. From these and other available sources he shall prepare a comprehensive report on the improvements and discoveries in Pharmacy, Chemistry, and Materia Medica, and the collateral branches of knowledge; on the changes in condition of Pharmaceutical Institutions, together with such statistical, biographical, and obituary notices as will furnish an epitome of the progress and changes in the science and practice of Pharmacy, and of its votaries at home and abroad.

ARTICLE IV. The Report on the Progress of Pharmacy shall commence with July 1st of the preceding year, and end with June 30th of the year in which it is submitted, shall be written in a form fitted for the printer, and shall be presented complete at the annual meeting.

ARTICLE V. In case of the illness or other inability of the Reporter to carry on the work of the report, the Permanent Secretary and the Chairman of the Executive Committee shall be required to make the best arrangements they can command, to continue the work to its completion.

CHAPTER VI.

Of Committees.

Article I. There shall be elected annually six standing committees: An Executive Committee, and a Committee on the Drug Market, each to consist of five members; a Committee on Papers and Queries, a Business Committee, a Committee on Prize Essays, and a Committee on Legislation; each to consist of three members.

Article II. The Executive Committee, of which the Permanent Secretary shall be a member, shall have charge of the revision of the Roll, the investigation of application for membership, and the publication of the Proceedings.

Article III. They shall report at each meeting a revised roll of members, with appropriate notices of deceased members, and the names of any who, having become disconnected with the Association, refuse to return their certificates of membership as provided by the By-Laws.

Article IV. They shall furnish to each member of the Association not in arrears one copy of the annual publication of the Proceedings, which publication shall contain the correct roll of members, full minutes of the several sittings, the Reports of the President and of the Committees, together with such addresses, scientific papers, discussions, notices of new processes, and preparations, as the Executive Committee may deem worthy of insertion, and shall fix the price at which the Proceedings shall be sold.

Article V. The Committee on the Drug Market shall report annually the condition of the Drug Market, the fluctuations in the supply and demand of drugs and chemicals, the variations in quality, and the adulterations and sophistications coming under their observation or reported to them by others, with any suggestions or recommendations for the improvement or better regulation of the trade; and they shall be authorized to report upon any adulterations and sophistications of immediate interest, through the Pharmaceutical Journals, as soon as practicable after their discovery.

Article VI. The Committee on Papers and Queries shall receive all Reports of Standing Committees, and all papers for the Association. They shall designate which of them shall be read at length, or which by title, and shall be furnished with a synopsis of each by the authors. They shall, in connection with the Business Committee, arrange the time which may be most appropriate or convenient for reading them.

Article VII. The Committee on Papers and Queries shall report, near the close of each Annual Meeting, a proper number of questions of scientific and practical interest, the answers to which may advance the interests of Pharmacy, and shall procure the acceptance of as many such questions for investigation as may be practicable.

Article VIII. Any person writing a paper for the Association must, to insure its publication in the Proceedings, refer the same with a synopsis of its contents to the Committee on Papers and Queries previous to the third session.

Article IX. It shall be the duty of every Standing Committee making a report annually to the Association, in like manner to furnish a copy of the same, together with a synopsis of its contents, to the Committee on Papers and Queries, before the first annual session of the Association.

Article X. The Business Committee shall be charged with the transmission of unfinished business from one Annual Meeting to another, and with collecting, arranging, and expediting the business during the sessions of the Annual Meetings.

Article XI. The Committee on Prize Essays shall, within six months after the Annual Meeting at which the essays are presented, determine which, if any of them, has met the requirements of the founder of the prize. In all other respects they shall be governed by the stipulations expressed by the donor. The decision of the committee, with such comments upon the successful essay only as they may deem proper, may be published in the journals of pharmacy.

Article XII. The Committee on Legislation shall keep a record of, and compile for reference, the enactments of the different States regulating the practice of pharmacy and the sale of medicines. They shall report to each stated meeting of the Association what legislation on the subject has occurred during the year.

CHAPTER VII.

Of Membership.

Article I. Every pharmaceutist and druggist of good moral and professional standing, whether in business on his own account, retired from business, or employed by another, and those teachers of Pharmacy, Chemistry, and Botany, who may be specially interested in Pharmacy and Materia Medica, who, after duly considering the objects of the Association and the obligations of its Constitution and By-Laws, are willing to subscribe to them, are eligible to membership.

Article II. Any person eligible to membership may make application in writing, with the indorsement of any two members of the Association in good standing, to any member of the Executive Committee, who shall report his application to the said Committee.

If after investigating his claims they shall approve his election, they shall, at the earliest time practicable, report his name to the Association, and he may be elected by two-thirds of the members present on ballot.

Article III. No person shall be a member of this Association, nor shall his name be placed upon the roll, until he shall have signed the Constitution and paid into the Treasury the sum of *Five Dollars* as an initiation fee, and the annual contribution for the current year, with the exception of *Delegates*, as provided in Article VI of this chapter.

Article IV. Every member shall pay in advance to the Treasurer the sum of *Five Dollars* as his yearly contribution, and is liable to lose his membership by neglecting to pay said contribution for *three successive years*.

ARTICLE V. Any member who shall pay to the Treasurer the sum of *Seventy-five Dollars at one time*, shall become a life member and shall be exempt from all future annual contributions.

ARTICLE VI. All local organizations of Pharmacists shall be entitled to *five* delegates, as their representatives in the Annual Meetings, who, *if present*, become members of the Association on signing the Constitution and paying the annual contribution for the current year, without paying the usual initiation fee.

ARTICLE VII. Members shall be entitled, on the payment of *Five Dollars*, to receive a certificate of membership signed by the President, one Vice-President, Permanent Secretary, and Treasurer, at the same time covenanting to return the same to the proper officer on relinquishing their connection with the Association.

ARTICLE VIII. Persons constitutionally elected to membership become permanent members, and their membership can cease only by resignation, non-payment of dues, or by expulsion, as provided in these By-Laws.

ARTICLE IX. Resignation of membership shall be made in writing to the Permanent Secretary or Treasurer, but no resignation shall be accepted from any one who is in arrears to the Treasury

All resignations shall be acknowledged in writing by the officer who receives them, and shall be reported at the next Annual Meeting.

ARTICLE X. Any member may be expelled for improper conduct or the violation of the Constitution, By-Laws, or Ethics adopted by the Association, but no person shall be expelled unless he shall receive for expulsion two-thirds of all the votes cast at some regular session.

ARTICLE XI. Pharmaceutists, chemists, and other scientific men, who may be thought worthy the distinction, may be elected honorary members. They shall not, however, be required to contribute to the funds, nor shall they be eligible to hold office, or vote at the meetings.

CHAPTER VIII.

Of Meetings.

ARTICLE I. The meetings shall be held annually; provided, that in case of failure of this from any cause the duty of calling the Association together shall devolve upon the President or one of the Vice-Presidents, with the advice and consent of the Executive Committee.

ARTICLE II. The order of business at the first session of each Annual Meeting shall be as follows:

Section 1. Promptly, at the time named in the notice issued for the meeting, the President, or in his absence one of the Vice-Presidents, or in their absence a President pro tempore, shall officiate.

Section 2. In the absence of the Permanent Secretary the President shall appoint a Recording Secretary pro tempore, who shall perform the duties of the Permanent Secretary until his arrival.

Section 3. Nineteen members shall constitute a quorum for the transaction of business.

Section 4 The President shall appoint a committee of three persons to examine the credentials of delegates, which committee shall attend to that duty. The President's address may then be read, after which the committee shall report to the Association as soon as practicable, when the Secretary shall call the roll, noting the names of the delegates and members in attendance.

Section 5. The Executive Committee shall present names recommended for membership, when the President, having ascertained that a quorum of members is present, shall order an election by ballot, and appoint two tellers.

Section 6. Reports of committees shall be presented, read by their titles, the synopsis, or in full, and laid on the table for future consideration.

Section 7. The President shall call the roll of Colleges and Associations represented, requesting each delegation in turn to appoint one member, the persons so selected to act as a committee to nominate officers and the Standing Committees for the ensuing year; in addition to which he shall appoint five members, who are not delegates, to act with the committee.

Section 8. The reports of the Executive Committee, of the Permanent Secretary, and of the Treasurer, shall be read by title or in full.

Section 9. A committee of five shall be appointed to examine and report upon specimens exhibited.

Section 10. Incidental business may be called up by the Business Committee.

ARTICLE III. The order of business at the second session of each Annual Meeting shall be as follows:

Section 1. The President shall call the Association to order.

Section 2. The Secretary shall read the minutes of the preceding meeting, which may be amended if necessary, and shall then be approved.

Section 3. The Report of the Committee on Nominations shall be read; when the President shall appoint tellers, and the Officers and Committees nominated shall be balloted for.

Section 4. The officers elected shall take their respective places.

Section 5. The Executive Committee shall present names recommended for membership, when a ballot shall be ordered for their election.

Section 6. Reports of Standing Committees shall be read.

Section 7. Reports of Special Committees shall be read.

Section 8. The second session shall close with the examination of specimens on exhibition.

ARTICLE IV. The order of business at subsequent sessions shall be determined by the Business Committee, with the consent of the Association.

CHAPTER IX.

Of Rules of Order and Debate.

Article I. The ordinary rules of parliamentary bodies shall be enforced by the presiding officer, from whose decision, however, appeals may be taken, if required by two members, and the meeting shall thereupon decide without debate.

Article II. When a question is regularly before the meeting, and under discussion, no motion shall be received but to adjourn, to lay on the table, for the previous question, to postpone to a certain day, to commit or amend, to postpone indefinitely; which several motions have precedence in the order in which they are arranged. A motion to adjourn shall be decided without debate.

Article III. No member may speak twice on the same subject, except by permission, until every member wishing to speak has spoken.

Article IV. On the call of any two members, the yeas and nays shall be ordered, when every member shall vote, unless excused by a majority of those present, and the names and manner of voting shall be entered on the minutes.

CHAPTER X.

Miscellaneous.

Article I. In all such points of order as are not noticed in these By-Laws the Association shall be governed by the established usages in all assemblies governed by parliamentary rules.

Article II. Every proposition to alter or amend these By-Laws shall be submitted in writing, and may be balloted for at any subsequent session, when, upon receiving the votes of three-fourths of the members present, it shall become a part of the By-Laws.

Article III. No one or more of these By-Laws shall be suspended.

FORM OF APPLICATION FOR MEMBERSHIP.

Approving of the objects of the American Pharmaceutical Association, I am desirous of joining it in membership; and, having read its Constitution and By-Laws, I hereby signify my approval of the same, and subscribe to them.

....

Address,..

I hereby agree to return my certificate of membership in the American Pharmaceutical Association to the Treasurer of that body, if I shall hereafter cease to be connected in membership with it.

....

TESTIMONIALS.

The undersigned, members in good standing, being personally acquainted with of testify to his moral character, his skill as a practical Druggist and Pharmaceutist, and his professional probity and good standing, and they recommend him for membership in the American Pharmaceutical Association.

Name.	Address.

ROLL OF MEMBERS.

HONORARY MEMBERS.

UNITED STATES OF AMERICA.

Daniel B. Smith,	Philadelphia,	Penna.,	1856.
George B. Wood, M.D.,	"	"	1857.

FOREIGN COUNTRIES.

AUSTRIA.

Anton von Waldheim, *Vienna*, 1871.

BELGIUM.

A. T. De Meyer, *Brussels*, 1868.

Norbert Gille, *Brussels*, 1868.

ENGLAND.

Dr. John Attfield, *London*, 1871.

Dr. Robert Bentley, *London*, 1872.

Henry B. Brady, *Newcastle-on-Tyne*, 1871.

Dr. J. Redwood, *London*, 1871.

FRANCE.

Dr. A. Chevalier, *Paris*, 1871.

Dr. J. Léon Soubeiran, *Montpelier*, 1871.

Dr. Augustin A. Délondre, *Sèvres*, 1871.

Stanislas Martin, *Paris*, 1872.

GERMANY.

Dr. Adolph Duflos, *Breslau*, 1871.

Dr. Hermann Hager, *Pulvermühle near Fürstenberg*, 1868.

Dr. F. A. Flückiger, *Strasburg*, 1868.

Dr. Frederick Mohr, *Bonn*, 1868.

Dr. G. C. Wittstein, *Munich*, 1868.

NETHERLANDS.

Dr. J. E. De Vrij, *Hague*, 1871.

RUSSIA.

Dr. G. Dragendorff, *Dorpat*, 1868.

ACTIVE MEMBERS.

☞ Members are requested to report any inaccuracies in these lists, and to notify the Secretary and Treasurer of all changes of address.

(The names of life members in SMALL CAPITALS. Names of life members under the old Constitution in *italics*.)

UNITED STATES OF AMERICA.

ALABAMA.

Mobile.

Candidus, Philip Charles,	1857
Mohr, Charles,	1871
Punch, William F.,	1874

ARKANSAS.

Little Rock.

McAlmont, John J.,	1871

CALIFORNIA.

San Francisco.

Brown, Joseph John,	1876
Moffitt, Thomas S.,	1861
Painter, Emlen,	1870
Simpson, William,	1870
Steele, Henry,	1859
Steele, James G.,	1859
Wenzell, William T.,	1870

Eureka, Humboldt Bay.

McKay, George J.,	1864

Marysville, Yuba Co.

Flint, John Henry,	1873

Vallejo, Solano Co.

Frost, James,	1870
Topley, James,	1869

COLORADO.

Central City.

Best, John,	1866

Del Norte, Conegos Co.

Cheney, Judson Rollin,	1868

Denver.

Covell, Thomas Jefferson,	1864

COLUMBIA, DISTRICT OF.

Georgetown.

Becker, Charles,	1875

Washington.

Baldus, William Theodore,	1872
Bannvart, Charles A.,	1856
Bury, Edward Berkley,	1870
Christiani, Charles,	1874
Cristiani, Theodore,	1873
Cromwell, Zachariah William,	1870
Drew, John Waters,	1876
Duckett, W. G.,	1876
Dufour, Clarence R.,	1876
Entwisle, William Burton,	1873
Ferguson, Robert Benedict,	1867
Heller, Peter Henry,	1871
Hickling, Daniel Percy,	1867
Howard, George Montgomerie,	1871
Kidwell, John Lawrence,	1856
Knabe, G. A.,	1876
Lewis, Samuel Edwin,	1875
Major, John Richards,	1873
Milburn, John Alexander,	1858
O'Donnell, James Dominic,	1870
Oldberg, Oscar,	1873
Price, Charles S.,	1876
Scala, William Franklin,	1876
Schafhirt, Adolph J.,	1876
Simms, Giles Green Craycroft,	1860
Taber, Edward Morris,	1874
Thompson, William Scott,	1871
Tyson, Samuel Ellicott,	1857

CONNECTICUT.

Hartford.

Goodrich, Stephen,	1875
Goodwin, Lester H.,	1875

Lambe, John J.,	1868
Rapelye, Charles A.,	1876
Wells, John C.,	1875
Williams, John K.,	1875

Danbury.

Percy, Frank V.,	1876

Litchfield.

Gates, Howard E.,	1873

Middletown.

Pitt, John R., Jr.,	1872

Naugatuck.

May, James O.,	1875

New Haven.

Daggett, Alfred, Jr.,	1865
Daggett, Henry,	1871
Kelsey, Henry, Jr.,	1873
Spalding, Walter A.,	1876
Wood, Alonzo Fulton,	1876

Norwich.

Osgood, Hugh H.,	1875
Sevin, N. Douglass,	1875

Stamford.

Haight, William B.,	1872
Morrison, Samuel C.,	1871

Wallingford.

Pickford, Thomas,	1875

Waterbury.

Dikeman, Nathan,	1859
Dimock, Robert H.,	1876
Munson, Luzerne J.,	1872
Woodruff, R. S.,	1876

West Winstead.

Phelps, Dwight,	1873

Windsor Locks.

Holden, Henry Clay,	1870

DAKOTA TERRITORY.

Yankton.

Eyster, Christopher Edward,	1871

DELAWARE.

Wilmington.

Belt, Z. James,	1876
McInall, Edward, Jr.,	1867
Shoemaker, Benjamin,	1867
Smith, Linton,	1870

FLORIDA.

Fort George.

Rollins, John Francis,	1859

Key West.

Murray, Francis Marion,	1876

Monticello.

Palmer, John Dabney,	1875

GEORGIA.

Atlanta.

Daniels, John B.,	1871
Peacock, Frederick S.,	1871
Schumann, Theodore,	1860
Taylor, Walter Adolphus,	1876

Augusta.

Chapman, Foster S.,	1875
Land, Robert H.,	1859
Tarrant, Homer Post,	1875

Macon.

Ingalls, John,	1876
Zeilin, John Henry,	1859

Milledgeville.

Clark, John M.,	1857
Grieve, Fleming G.,	1859
Cotting, William A.,	1869

Rome.

Fenner, William R.,	1871

ILLINOIS.

Belleville.

Steingoetter, Henry,	1871

Bloomington.

Dyson, Dunbar S.,	1856

Bradford, Stark Co.

Plummer, David G.,	1869

Champaign.

Day, Charles W.,	1873

Chicago.

Bartlett, Nicholas Gray,	1864
Biroth, Henry,	1865
Blocki, William F.,	1863
Borcherdt, Julius C.,	1867
Borland, Matthew Wilson,	1876
Buck, George,	1860
Ebert, Albert Ethelbert,	1864
Fox, Daniel S.,	1872
Fredigke, Charles Christian,	1869
Fuller, Henry W.,	1865
Fuller, Oliver F.,	1869
Gale, Edwin O.,	1857
Gale, William H.,	1857
Garrison, Herod Daily,	1869
Heuermann, Henry W.,	1869
Heylman, Charles,	1865
Hogan, Louis C.,	1876
Holt, Alvin E.,	1873
Hooper, John H.,	1865
Jacobus, Judson S.,	1870
Jamieson, Thomas N.,	1869
Jauncey, William,	1873
Krusemarck, Charles,	1876
Mahla, Frederick,	1864
McPherson, George,	1865
Mill, James W.,	1864
Milleman, Philip Lionel,	1866
Palmer, Hosea W.,	1870
Parsons, John,	1865
Patterson, Theodore H.,	1869
Reinhold, William,	1866
Sargent, Ezekiel Herbert,	1864
Sharp, J. Perine,	1865
Smith, Albert A.,	1869
Strehl, Louis C.,	1866
Sweet, Henry,	1865
Vogeler, Adolf G.,	1876
Wheeler, C. Gilbert,	1876
Whitfield, Thomas,	1865
Willard, Joseph,	1865
Wilson, Julius H.,	1869
Woltersdorf, Louis,	1865

Englewood, Cook Co.

Peirpoint, Newton,	1869

Galesburg.

Clark, Albert B., Jr.,	1868
Devendorf, Almond Smith,	1872

Highland.

Mueller, Adolphus,	1871

Mascoutah.

Henrich, George,	1875

Okawville, Washington Co.

Streit, Alexander G. F.,	1874

Peoria.

Singer, Peter J.,	1869

Quincy.

Schroder, Hermann,	1871

INDIANA.

Evansville.

Lilly, James E.,	1872

Fort Wayne.

Hisner, Henry C. W.,	1874
Wright, William, Jr.,	1859

Indianapolis.

Dryer, James W.,	1871
Kielhorn, Henry,	1874
Schrader, Henry,	1869
Sloan, George W.,	1857

Jeffersonville.

Loomis, John Clarence,	1876

Lawrenceburgh.

Ferris, Charles E.,	1874

Logansport.

Dale, Frank C.,	1874

Madison.

Harper, Frank M.,	1874

New Albany.

Conner, Jefferson S.,	1876
Scribner, Benjamin Franklin,	1858

Rushville.

Pugh, Finley B.,	1876

Tell City.

Schreiber, August,	1876

Terre Haute.

Buntin, William C.,	1874

IOWA.

Burlington.

Squires, C. P.,	1876
Wigert, Carl R.,	1876

Davenport.

Ballard, John W.,	1871

Dubuque.

Ruete, Theodore W.,	1870

Fort Madison.

Schaefer, George H.,	1871

Monticello.

Tiarks, Hermann,	1876

Washington.

Cook, William A.,	1871
Ink, Parker P.,	1872

KANSAS.

Fort Scott.

Ingalls, Albert O.,	1869

Lawrence.

Leis, George,	1869

Leavenworth.

Brown, Robert J.,	1862
Harrop, Joseph W.,	1869
Parham, Robert,	1868
Pettit, Henry M.,	1860

KENTUCKY.

Catlettsburg.

Patton, William Allison,	1873

Covington.

Nodler, Peter,	1870
Zwick, George Gilbert,	1874

Frankfort.

Averill, William Henry,	1874

Hopkinsville.

Gray, Francis Marion,	1876

Lexington.

Frost, John J.,	1874
Richardson, Marius D.,	1874

Louisville.

Bell, Gotthard Emmanuel,	1874
Carey, George Hamet,	1866
Colgan, John,	1867
Davis, Vincent,	1874
Diehl, Conrad Lewis,	1863
Huddart, John Fletcher,	1870
Hughes, Henry Arnold,	1857
Jones, Simon Newton,	1870
Lingelbach, Ferdinand,	1874
McAfee, James Alexander,	1874
Miller, Frederick Christopher,	1874
Mobley, Cyrus Lyman,	1874
Newman, George Abner,	1866
Peter, Arthur,	1874
Pfingst, Edward Charles,	1874
Pfingst, Ferdinand John,	1867
Pfingst, Henry Adolph,	1874
Reynolds, John J.,	1876
Rogers, Wiley,	1874
Scheffer, Emil,	1872
Schmidt, William George,	1874
Strassel, William,	1870
Sutton, Ellsworth Septimus,	1871
Sutton, Peter Priest,	1871
Wilder, Graham,	1868

Maysville.

Blattermann, George W.,	1876

LOUISIANA.

New Orleans.

Bugge, Andreas Valdemar,	1868
Genois, Louis,	1876
Girling, Robert N.,	1876

Keffer, William P., . . . 1866
Lyons, Isaac L., . . . 1875

Bayou Goula.

Viallon, Paul L., . . . 1870

Gretna.

Langebecker, Charles O., . 1876

New Iberia.

Lee, James A., . . . 1856

Plaquemine.

Delavallade, John M., . . 1873

Thibodeaux.

Thibodeaux, Joseph G., . . 1870

Vidalia.

Schaaf, Justus Henry, . . 1875

MAINE.

Augusta.

Partridge, Charles K., . . 1867

Bangor.

Harlow, Noah Sparhawk, . 1859
Patten, John F., . . . 1871

Bath.

Anderson, Samuel, . . . 1876

Belfast.

Moody, Richard H.,. . . 1876

Biddeford.

Boynton, Herschell,. . . 1875

Eastport.

Shead, Edward Edes, . . 1866

Ellsworth.

Parcher, George A., . . 1875

Lewiston.

Cook, John G., . . . 1859
Wakefield, Seth D.,. . . 1875

Portland.

Cummings, Henry T., . . 1853
Hay, Henry H., . . . 1867
Jordan, William H., . . 1871
Phillips, Walter F., . . . 1859

Richmond.

Donnell, J. Woodbury, . . 1875

Searsport.

Curtis, Lebbens, . . . 1875

Waterville.

Plaisted, James H., . . . 1875

MARYLAND.

Baltimore.

Andrews, George W., . . 1856
Baxley, Jackson Brown, . . 1856
Beam, Isaac Richard, . . 1873
Brack, Charles, . . . 1876
Brown, Alexander E., . . 1863
Brown, William H., . . 1863
Burrough, Edward Ewalt, . 1869
Dohme, Charles Emile, . . 1863
Dohme, Lewis, . . . 1859
Donavin, Matthew W., . . 1867
Eareckson, Edwin, . . . 1875
Elliott, Henry Alexander, . 1859
Emich, Columbus Valentine, . 1863
Frames, James P., . . . 1868
Gossman, Adam J., . . . 1870
Hancock, John Francis, . . 1863
Hassencamp, Ferdinand, . . 1872
Jackson, Vincent Rodman, . 1876
Jefferson, John H. B., . . 1868
Jennings, Nathaniel Hynson, . 1857
Kleinschmidt, A. Alexander, . 1873
Lauer, Michael John, . . 1865
Lautenbach, Robert, . . 1870
Lilly, Alonzo, Jr., . . . 1863
Mitnach, Henry, . . . 1873
Monsarrat, Oscar, . . . 1856
Moore, Jacob Faris, . . . 1856
Morrison, S. Ellwood, . . 1863
Muth, John Philip, . . . 1864
Osburn, William Henry, . . 1870
Perkins, Elisha Henry, . . 1857
Potts, Jesse Newport, . . 1870
Roberts, Joseph, . . . 1856

Russell, Eugene J.,	1856
Russell, Edward Walton,	1863
Sappington, Richard,	1870
Sharp, Alpheus Phineas,	1855
Sylvester, Samuel Retallack,	1858
Thienemann, Charles,	1876
Thompson, William Silver,	1856
Thompson, William Partlow,	1874
Thomsen, John J.,	1856
Tilyard, Charles Slade,	1867
Webb, John Alanson,	1870
Winkleman, John Henry,	1864
Woodward, Samuel Morris,	1874

Annapolis.

Button, Elijah,	1870

Cumberland.

Rohrbach, Theodor,	1876
Shriver, Henry,	1876
Shryer, Thomas Wilson,	1875

Hagerstown.

Winter Jonas,	1863

MASSACHUSETTS.

Boston.

Atwood, Charles Henry,	1856
Babcock, James F.,	1875
Babo, Leopold,	1859
Barry, Daniel Edward,	1875
Bartlett, William Williams,	1875
Bassett, Charles Harrison,	1867
Bolles, William,	1875
Boyden, Ashel,	1853
Boyden, Edward Cleveland,	1874
Brown, Joseph Taylor,	1859
Brown, Joseph Taylor, Jr.,	1869
Burnett, Joseph,	1852
Campbell, Isaac Towle,	1859
Canning, Henry,	1865
Carter, Solomon,	1865
Colcord, Samuel Marshall,	1852
Colton, James Byers,	1865
Craig, John Smith,	1875
Cutler, Edward Waldo,	1859
Doliber, Thomas,	1859
Doolittle, Erastus Hubbard,	1865
Drury, Linus Dana,	1871
Duncan, Jefferson Eddy,	1871
Dyer, Joseph Howes,	1865
Eaton, Charles Irving,	1867
Folger, William Swain,	1875
Follansbee, Sherman,	1875
Fowle, Henry Dearborn,	1853
French, George Washington,	1865
Fuller, Sumner Howard,	1875
Gilman, Samuel Kinsman, Jr.,	1876
Gleeson, James Andrew,	1859
Gleeson, Michael Henry,	1859
Godding, John Granville,	1875
Hatch, Frederick A.,	1876
Henchman, Daniel,	1853
Hoagland, Pratt Ralph,	1868
Horton, William Francis,	1869
Hoyt, George Melvin,	1875
Jenkins, Luther Lincoln,	1867
Jenks, Thomas Leighton,	1875
Jones, James Taber,	1875
Jones, William Henry,	1875
Kelly, Edward Samuel,	1871
Kent, Robert R.,	1855
Leary, Jeremiah Thomas,	1869
Littlefield, Alvah,	1856
Lowd, John Colby,	1871
Lowden, John,	1875
Markoe, Geo. Frederick Holmes,	1863
Melvin, James Samuel,	1853
Merrick, John M.,	1875
Metcalf, Theodore,	1857
Nowell, William Frederick,	1867
O'Brien, James J.,	1875
Parker, Joseph Lyman,	1864
Patch, Edgar Leonard,	1872
Patten, Ichabod Bartlett,	1858
Perry, Edward Howland,	1865
Restieaux, Thomas,	1853
Ricker, George Dexter,	1858
Rideout, James W.,	1875
Sears, George T.,	1875
Sewall, David H. Jewett,	1875
Sharples, Stephen Paschell,	1875
Sheppard, Samuel Airus D.,	1865
Simson, Francis Cook,	1876
Smalley, Elijah,	1860
Smith, Albert E.,	1875
Snow, Jesse Walker,	1875

Stowell, David,	1875
Talbot, James Stewart,	1873
Tompkins, Orlando,	1859
Tower, Levi, Jr.,	1860
Trask, Charles M.,	1875
Turner, Thomas Larkin,	1853
Underwood, Charles G.,	1865
Warren, George W.,	1875
Webster, Stephen,	1875
Whall, Joseph Stokes,	1873
Wilkins, Daniel Gilbert,	1865
Wilson, Benjamin Osgood,	1859
Winslow, Samuel W.,	1875
Woodbridge, George Washington,	1859
Wright, William P.,	1875

Andover.

Parker, George H.,	1874

Cambridge.

Hubbard, John H.,	1866
James, Thomas P.,	1857

Cambridgeport.

Bayley, Augustus R.,	1859
Orne, Joel Stone,	1859
Orne, Charles Parker,	1874
Thayer, Henry,	1858

Charlestown.

Kettell, George Parker,	1867
Marshall, Ernest Clifton,	1875
Stacey, Benjamin Franklin,	1860

Chelsea.

Buck, John,	1855

Chicopee.

Smith, Warren,	1874

Danvers.

Merrill, Walter S.,	1875

Dorchester.

Prescott, Horace Augustus,	1875

Fall River.

Redfearn, John,	1873

Fitchburg.

Fortier, Zepherin,	1875

Great Barrington.

Lillie, Charles,	1875
Morgan, Richard Evan,	1875
Whiting, Frederick T.,	1863

Greenfield.

Childs, Louis Marshall,	1875

Haverhill.

Carey, Edwin Franklin,	1875
Frothingham, Edward G., Jr.,	1875

Hingham.

Hunt, James Lewis,	1865
Lincoln, Henry Ware,	1853

Hinsdale.

Plummer, George Bolton,	1875

Holyoke.

Wild, Joseph Oscar,	1873

Hudson.

Burnham, George H.,	1871
Whitman, Nelson Samuel,	1875

Lawrence.

Whitney, Henry M.,	1859

Lee.

Noyes, Daniel N.,	1873

Lowell.

Bailey, Frederick,	1869
Butler, Freeman Hall,	1874
Hood, Charles I.,	1871
Kidder, Samuel, Jr.,	1859
Safford, William Augustus,	1865

Lynn.

Gordon, Edward Bertelle,	1875
Proctor, Benjamin,	1859
Tozzer, Samuel Clarence,	1875

Medford.

Clough, Thomas R.,	1875

Middleboro.

Drake, Charles W.,	1873

Milford.

Rice, J. Allen,	1875

Monson.

Phipps, John Mellen,	1875

Nantucket.

Jaggar, Charles H.,	1875

Natick.

Daniels, Samuel Olney,	1875

New Bedford.

Blake, James E.,	1866
Hadley, Frank R.,	1872
Lawton, Charles H.,	1873
Lawton, Horace A.,	1873
Shurtleff, Israel H.,	1875
Taylor, John P.,	1875

Newburyport.

Atkinson, Albert J.,	1875
Goodwin, William W.,	1853

Newton Centre.

Noble, John J.,	1875
Williams, Joseph,	1875

North Adams.

Griswold, William Henry,	1874
McDonald, William,	1873

Northampton.

Wells, Charles C.,	1876

North Andover.

Berrian, George W., Jr.,	1857

Pittsfield.

Atwood, Luther Lee,	1876

Rockland.

Denham, Charles Sumner,	1875
Easton, Luther Waite,	1875
Estes, Joseph Joselyn,	1870

Rockport.

Blatchford, Eben,	1857

Salem.

Nichols, Thomas B ,	1876

Shelbourne Falls.

Baker, Edwin,	1875

Somerville.

Cowdin, George Henry,	1875
Flanagan, Lewis Cass,	1875

Springfield.

Alden, Charles P.,	1874
Ferree, Henry D.,	1875
Masters, T. Edward,	1873
Preston, Alfred J.,	1873
Webber, Joseph T.,	1873
Wilson, Howard E.,	1873

Taunton.

Marvel, Amos Francis,	1875

Ware.

Wilder, Frederick Wales,	1875

Warren.

Harwood, Frank Lucian,	1875
Harwood, Lucian,	1875

Worcester.

Burbank, George G.,	1875
Bush, William,	1875
Fairbanks, Harlan,	1876
McConville, Thomas Aloysius,	1864
Scott, David,	1855
Scott, Nelson R.,	1859
Willard, William Henry,	1875

MICHIGAN.

Ann Arbor.

Eberbach, Ottmar,	1869
Prescott, Albert B.,	1871

Battle Creek.

Wardell, Robert C.,	1860

Detroit.

Caldwell, James W.,	1875
Johnston, William,	1860
Ronnefeld, Theodore,	1866
Vernor, James,	1866

East Saginaw.

Dunk, Alfred A.,	1867

Garrigues, Samuel S.,	1855
Melchers, Henry,	1869

Jackson.

Austin, George W.,	1865
Weeks, Eugene J.,	1866

Kalamazoo.

MacDonald, George,	1871

Monroe.

Sackett, Samuel M.,	1876

Muskegon.

Wagener, Samuel H.,	1869

Pentwater.

Jesson, Jacob,	1872

Saginaw City.

Keeler, William H.,	1872
Moll, William,	1869

Schoolcraft.

James, George R.,	1869

MINNESOTA.

St. Paul.

Sweeney, Robert Ormsby,	1866

MISSISSIPPI.

Columbus.

Osborne, Hampden,	1869

Jackson.

Ash, Matthew F.,	1856
Buck, John T.,	1868

MISSOURI.

St. Louis.

Alexander, Maurice W.,	1871
Ayers, James M.,	1872
Bang, Charles,	1871
Blake, Amos R.,	1871
Blank, Alois,	1871
Blickhahn, George F.,	1871
Boehm, Solomon,	1871
Brown, Charles Scott,	1873
Catlin, Ephron,	1871
Catlin, Theron,	1871
Chamberlain, Guilford T.,	1853
Chase, Charles D.,	1872
Connor, James F.,	1871
Crawford, William H.,	1864
Crawley, Francis Xavier,	1869
Curtman, Charles O.,	1871
D'Amour, Otto,	1871
Glenn, Thomas Smith,	1870
Good, James M.,	1871
Grandjean, Charles,	1871
Grandjean, Eugene,	1871
Grant, William R.,	1871
Guerdon, John,	1871
Hensel, Samuel T.,	1872
Jones, Charles Kendall,	1867
Kalb, Theodore,	1864
Kirkbride, Joseph Cooper,	1869
Krebs, Hugo,	1871
Leitch, Arthur,	1860
Mallinckrodt, Gustavus,	1869
Mallinckrodt, Edward,	1869
Meyer, Christian F. G.,	1860
O'Gallagher, James,	1858
Pfeiffer, Adolph,	1876
Physick, Henry Sanford,	1870
Primm, Hubert,	1855
Richardson, J. Clifford,	1871
Sander, Enno,	1858
Scheffer, Henry W.,	1863
Scholz, Philip,	1871
Sennewald, Ferdinand William,	1865
Ude, George,	1871
Vardick, August H.,	1874
Williamson, E. J.,	1876
Witte, L. Edward,	1871

Chillicothe.

Boyce, Samuel F.,	1871

Hannibal.

Orynski, Leonardo,	1871

Macon.

Field, Amos,	1871

Mexico, Adrian Co.

Llewellyn, John Frederick,	1867

Ravenna, Mercer Co.

Featherston'h, Edward R.,	1871

Weston.

Parr, John C., ... 1856

NEBRASKA.

Omaha.

Goodman, Charles Frederick, . 1871

NEVADA.

Aurora.

Green, Alexander Alfred, . 1868

Virginia City.

Brackett, Aurick S., . . 1868
Perkins, William Alexander, . 1869

NEW HAMPSHIRE.

Allentown.

Hildreth, Charles Francis P., . 1874

Concord.

Eastman, Charles Smith, . . 1874
Foster, Henry B., . . . 1874
Morgan, James, . . . 1859
Underhill, George Francis, . 1874

Dover.

Pinkham, Alonzo Taylor, . 1874
Rackley, Benjamin Franklin, . 1874
Tufts, Charles Augustus, . . 1856
Vickery, William Henry, . 1874

Exeter.

Merrill, Charles A., . . . 1858

Keene.

Appleton, George J., . . 1873

Lancaster.

Colby, Frank A., . . . 1876
Noyes, Parker Jewett, . . 1874

Littleton.

Morrill, Benjamin, . . . 1876

Manchester.

Jones, Charles Mortimer, . 1869
Littlefield, Chauncey Bonney, . 1868
Perry, Bayard Taylor, . . 1876

Nashua.

Russell, Elias Smith, . . 1875

New Market.

Dearborn, George L., . . 1853

North Conway.

Wingate, Jeremiah Young, . 1875

Portsmouth.

Marvin, Thomas Ellison Oliver, 1875
Thacher, Joseph Haven, . . 1859

Rochester.

Shaw, Stephen F., . . . 1876

Somersworth.

Moore, George, . . . 1859

NEW JERSEY.

Basking Ridge.

Muchmore, William Fletcher, . 1868

Burlington.

Vandegrift, John A., . . 1867

Camden.

Brown, Albert P., . . . 1870
Cochran, Samuel W., . . 1876
De la Cour, Joseph Lauriat, . 1870
Lee, Emmor H., . . . 1875
Sommers, Richard Miller, . 1876
Test, Alfred W., . . . 1870

East Orange.

Rumsey, S. L., . . . 1876

Elizabeth.

Barnaby, Thomas J., . . 1870
Drake, Jonathan B., . . 1875
Oliver, William M., . . 1875

Elizabethport.

Frohwein, Richard, . . . 1867

Hoboken.

Klussmann, H., . . . 1876

Jersey City.

Abernethy, Maxwell, . . 1865

Cusack, Robert,	1875
Dougherty, Samuel E.,	1875
Finlay, Norman J.,	1875
Gardner, Robert W.,	1872
Kirsten, Adolph,	1867
Laird, William R.,	1867
Levering, P. Wharton,	1876
Mellor, Godfrey K.,	1875
Mercein, James R.,	1865
Pauly, Christian,	1875
Phillips, George W. C.,	1871
Sherman, Oliver G.,	1869
White, George H.,	1868
Wienges, Conrad,	1875

Moorestown.

Warrington, Charles W.,	1876
Worthington, J. Willits,	1873

Morristown.

Carrell, Eugene A.,	1875
Dalrymple, Charles Hoagland,	1860
McCarty, William,	1873

Mount Holly.

Miller, Louis,	1874
White, Aaron Smith,	1860

Newark.

Badger, Charles W.,	1870
Bruguier, Francis,	1876
Dreher, Ernest,	1869
Havenstein, Alexander,	1870
Hitchcock, William Edwin,	1875
Holzhauer, Charles,	1873
Jacques, Isaac W.,	1869
Littell, William M.,	1870
Mills, Andrew M.,	1872
Nichols, Edward Payson,	1870
Peters, Alexander C.,	1868
Smith, Charles Bradley,	1868
Smith, Israel P.,	1876
Stamford, William H.,	1876
Townley, William M.,	1875
Vandervoord, Ransford Wells,	1870
Van Gieson, Theron W.,	1869
Van Winkle, Abraham W.,	1871

New Brunswick.

Rust, William,	1870

Orange.

Harlow, Wickham N.,	1874

Plainfield.

Reynolds, Howard Prescott,	1875
Shaw, Robert Johnston,	1875
Vorhees, William H.,	1868

South Amboy.

Jacques, George W.,	1869

Trenton.

Mangold, George Adolph,	1875
Rickey, Randal,	1870

NEW MEXICO.

Santa Fé.

Krummeck, Jacob,	1867

NEW YORK.

New York City.

Alsdorf, John,	1872
Ambler, Starr Hoyt,	1876
Atwood, Hermon W.,	1873
Balluff, Paul,	1860
Balser, Gustavus,	1875
Bedford, Peter Wendover,	1859
Billings, Henry M.,	1869
Bischof, Albert Sigismund,	1875
Bond, Joseph R.,	1876
Buehler, Edward Handy,	1874
Burdge, Jacob U.,	1876
Campbell, Horace W.,	1875
Carle, John, Jr.,	1860
Cassebeer, Henry A.,	1858
Cassebeer, Henry A., Jr.,	1872
Chandler, Charles F.,	1867
Close, Eldridge W.,	1874
Cole, Theodore,	1873
Creuse, Jules L. A.,	1871
Currie, John H.,	1858
Davis, Benjamin,	1869
Day, Walter De Forest,	1873
Dege, George F.,	1868
Ditman, Andrew J.,	1868
Dung, Albert C.,	1872
Eimer, Charles,	1872

Faber, John,	1857
Fairchild, Benjamin Thomas,	1875
Fisher, William,	1862
Fraser, Edward A.,	1873
Frey, John,	1865
Fougera, Edmund C.,	1867
Frohwein, Max,	1865
Frohwein, Theobald,	1862
Gardiner, Warren B.,	1860
Gilmore, John W.,	1867
Gellatly, William A.,	1858
Green, Thomas T.,	1858
Gridley, Junius,	1853
Griffith, William H.,	1874
Hale, Frederick,	1855
Haviland, Henry,	1857
Hays, David,	1867
Hebberling, Gottfried,	1867
Henes, William F.,	1876
Higgins, James S.,	1862
Hoffmann, Frederick,	1867
Hohenthal, Charles F. L.,	1865
Hudnut, Alexander,	1857
Imhof, Henry,	1872
Jarrett, Henry Thomas,	1875
Johnson, Edward L.,	1860
Kalish, Julius,	1875
Kiersted, Henry T.,	1856
Kimmel, Henry,	1867
Krehbiel, Gustavus,	1865
Kuhles, Philip,	1873
Lazell, Lewis T.,	1858
Lehlbach, Paul Frederick,	1872
Lehn, Louis,	1874
Macmahan, Thomas Jackson,	1871
Main, Thomas Francis,	1872
Marsh, Edward H.,	1858
McIntyre, Byron F.,	1876
McIntyre, Ewen,	1873
McKesson, John, Jr.,	1867
Milhau, Edward L.,	1858
Molwitz, Ernest,	1867
Morrison, Thomas O.,	1876
Neergaard, William,	1859
Osmun, Charles A.,	1868
Peixotto, Moses Levi Maduro,	1869
Pfingsten, Gustavus,	1873
Porter, George G.,	1860
Ramsperger, Gustavus,	1860
Reichard, F. Alfred,	1871
Rice, Charles,	1870
Ricksecker, Theodore,	1875
Robbins, Charles Albert,	1876
Robbins, Daniel C.,	1862
Royce, Lucien M.,	1866
Runyon, Edward Wheelock,	1875
Sands, George G.,	1867
Scofield, James S.,	1867
Seabury, George J.,	1876
Seward, Daniel W.,	1874
Sheddon, John W.,	1859
Sheils, George E.,	1860
Skelly, James T.,	1866
Starr, Thomas,	1870
Tscheppe, Adolph,	1876
Wanier, George S ,	1876
Weaver, James,	1860
Weinman, Oscar C.,	1873
Weismann, Augustus W.,	1869
Wellcome, Henry Solomon,	1875
Wenck, George J.,	1869
Westerfield, Joseph H.,	1858
Wheeler, Lucian F.,	1858
White, Philip A.,	1872
Wickham, William Hull,	1870
Wilson, William,	1876
Zellhoefer, George,	1876

Brooklyn.

Althans, Charles A.,	1873
Barnaby, James Otis,	1870
Bassett, Francis M.,	1860
Booth, Clarence,	1875
Chadwick, Alexander B.,	1872
Close, George C.,	1858
Curtiss, Charles Grenville,	1866
Cutts, Foxwell Curtis, Jr.,	1875
Day, Carlos E.,	1870
Daycock, William Henry,	1874
Dennin, Charles,	1875
Douglass, Henry, Jr.,	1875
Dunn, John A.,	1867
Dupuy, Eugene,	1852
Harner, James M.,	1867
Heydenreich, Emile,	1867
Heydenreich, F. Victor,	1860

Jones, Thomas,	1868
Kitchen, Charles W.,	1865
Krieger, Philip,	1876
Lawlor, Charles J.,	1874
Lewis, Thomas,	1867
Livingstone, Benjamin V. B.,	1872
McElhenie, Thomas D.,	1872
Menninger, Henry J.,	1866
Newman, George A.,	1865
Nicol, Louis Edgar,	1875
Niebrugge, John H.,	1861
Nietsch, Adolph J. W.,	1872
Ollif, James H.,	1867
Owens, Richard J.,	1860
Peduzzi, George S.,	1861
Pyle, Cyrus,	1859
Snyder, Ambrose C.,	1867
Squibb, Edward R.,	1858
Tartis, Alfred J.,	1867
Ubert, Julius,	1876
Vincent, William,	1870
Wendler, Robert,	1876
Wynn, William,	1867
Albany.	
Cutler, John N.,	1870
Angola, Erie Co.	
Oatman, Le Roy S.,	1872
Athens.	
Post, E.,	1876
Ballston Spa.	
Hunt, Henry H.,	1876
Buffalo.	
Fischer, Edward J.,	1875
Peabody, William H.,	1857
Rano, Charles O.,	1866
Tibbs, William H.,	1871
Elmira.	
Bidwell, Marshall Spring,	1871
Fishkill, on Hudson.	
Moith, Augustus Theodore,	1860
Flushing.	
Hepburn, John,	1873
Luzerne, Warren Co.	
Miller, George Yenington,	1872
Medina.	
Burroughs, S. M.,	1876
Middletown.	
King, James Theodore,	1859
Rogers, William Henry,	1869
Mount Vernon.	
Gill, George,	1872
Peek, Anley W.,	1874
New Lebanon.	
Tilden, Henry A.,	1858
Niagara Falls.	
Griffith, Hiram E.,	1875
Norwich.	
Torrey, Charles Edward,	1876
Plattsburgh.	
Cady, Hiram Walworth,	1870
Port Chester.	
Hyler, William Henry,	1875
Port Jervis.	
Cook, George L.,	1872
McDougall, James,	1874
Potsdam.	
Thatcher, Hervey D.,	1865
Poughkeepsie.	
Brown, George R.,	1876
Sherwood, Hezekiah Shorey,	1870
Rochester.	
Haas, George Hermann,	1872
Lane, Alfred S.,	1857
Paine, James D.,	1857
Rome.	
Bissell, John G.,	1875
Broughton, A. J.,	1876
Rondout.	
Laycock, Washington,	1857
Sag Harbor.	
Lobstein, J. F. Daniel,	1868

Sandbank.

Belden, James L.,	1874
Kelley, Edward F.,	1870

Saratoga Springs.

Fish, Charles F.,	1866
Fish, George H.,	1869
Lamberton, John F.,	1872
Mingay, James,	1873

Syracuse.

Chamberlain, Humphrey Barker,	1874
Dawson, Edward Seymour, Jr.,	1876
Snow, Charles W.,	1876

Tompkinsville, L. I.

Bassett, John W.,	1875

Troy.

Knowlson, Alexander M.,	1875
Sliter, Albert H.,	1875

Utica.

Ballard, George S.,	1874
Howarth, John W.,	1874

West Farms.

Webb, Henry E.,	1865

Yonkers.

Stephens, William G.,	1860
Toplis, Robert J.,	1863

NORTH CAROLINA.

Chapel Hill.

Saunders, Richard B.,	1858

Charlotte.

Smith, Thomas C.,	1876

Fayetteville.

Hindsdale, Samuel J.,	1875

Raleigh.

Lee, Addison Sherwin,	1873
Simpson, William,	1873

Washington.

Gallagher, Charles K.,	1857
Gallagher, James M.,	1875

OHIO.

Cincinnati.

Bain, Adrian W.,	1874
Eger, George,	1864
Feemster, Joseph H.,	1873
Fennel, Adolphus,	1864
Foertmyer, Adolphus W.,	1864
Fratz, John G.,	1864
Gordon, William John Maclester,	1854
Greve, Theodore L. A.,	1864
Heinemann, Otto,	1864
Helman, Charles M.,	1864
Hill, Alfred C.,	1864
Hill, Hiram H.,	1864
Hottendorf, Augustus,	1864
Judge, John F.,	1866
Karrmann, William,	1864
Koehnken, Herman Henry,	1875
Keeshan, John,	1864
Lloyd, John Uri,	1870
Markward, James,	1864
Merrell, William S.,	1854
Reinlein, Paul,	1856
Rendigs, Charles Peter,	1876
Reum, Hermann F.,	1864
Schwab, Louis,	1876
Wagner, Henry,	1876
Wangler, C. D.,	1876
Wayne, Edward S.,	1854
Wells, Jacob David,	1864
Yorston, Matthew Mackay,	1864

Akron.

Armstrong, A. M.,	1876

Alliance.

Barr, Peter H.,	1867

Ashland.

Foltz, William K.,	1872

Bryan.

Snyder, Alva L.,	1873

Canton.

Geiger, Walter P.,	1867

Chillicothe.

Howson, Walter H.,	1875

Circleville.

Fickardt, George H.,	1864

Cleveland.

Gaylord, Henry C.,	1869
Hartness, William H.,	1872
Hopp, Lewis C.,	1876
Huling, Bruce,	1872
Mayell, Alfred,	1872
Moore, James Penn,	1872
Scott, William J.,	1872
Spenzer, Peter J.,	1872
Vaupel, Charles P.,	1872

Columbus.

Boyd, Abraham,	1869
Huston, Charles,	1872
Ritson, Alfred,	1870
Roberts, John S.,	1872

Elyria.

Hill, Frank P.,	1872

Fredericktown.

Jefferson, William E.,	1875

Ironton.

Ball, Theophilus B.,	1874

Logan.

Harrington, Frank,	1869

Massillon.

Baltzly, Z. T.,	1876

Middletown.

Hatfield, Vermont,	1874
Johnson, Charles B.,	1876

Navarre.

Garver, Alexander,	1866
Grossklaus, John F.,	1859

Salem, Columbiana Co.

Hawkins, M. Smith,	1870

Sandusky.

Graham, William A.,	1876

Shreve.

Bertolett, William J.,	1872

Springfield.

Casper, Thomas J.,	1867
Ludlow, Charles,	1872
Smith, Charles G.,	1874
Stout, William A.,	1875

Toledo.

Hohley, Charles,	1872

Wooster.

Ohliger, Lewis P.,	1871

Youngstown.

Neal, Leander,	1858

OREGON.

Portland.

Hodge, Charles,	1859

PENNSYLVANIA.

Philadelphia.

Abell, Walter B.,	1867
Angney, John R.,	1867
Bakes, William C.,	1864
Bauer, Louis G.,	1867
Biddle, Charles Johnson,	1875
Blair, Andrew,	1865
Blair, Henry C.,	1868
Blinkhorn, George,	1860
Borell, Henry Augustus,	1874
Boring, Edwin McCurdy,	1867
Bossler, David Jervis,	1873
Bower, Henry,	1860
Bower, Henry A.,	1868
Bowker, James,	1876
Bullock, Charles,	1857
Bunting, Samuel S.,	1857
Burk, William B.,	1873
Caldwell, James Marshall,	1866
Campbell, Hugh,	1876
Campbell, Samuel,	1864
Carpenter, George W.,	1873
Chapman, Samuel,	1857
Chipman, Edward D.,	1872
Coombe, Thomas R.,	1860
Cramer, Henry,	1867
Dobbins, Edward T.,	1867
Eberle, Charles Louis,	1865

Eddy, Henry C.,	1869
Eldridge. George W.,	1865
Ellis, Evan T.,	1857
England, Robert,	1868
Erben, John S.,	1868
Evans, William, Jr.,	1860
Fox, Peter Paul,	1869
Früh, Carl D. S.,	1876
Gaillard, Edward,	1876
Gerhard Samuel,	1873
Grahame, Israel J.,	1856
Grove, John E.,	1868
Haenchen, Charles Eugene,	1865
Hance, Edward H.,	1857
Hancock, Charles West,	1868
Hancock, John Henry,	1870
Hazard, Thomas H.,	1870
Hazlett, Edward Everett,	1876
Heintzelman, Joseph A.,	1858
Hurst, John C.,	1868
Jackson, James M.,	1874
Jefferson, Charles L.,	1869
Jenks, William J.,	1858
Johnson, Benjamin F.,	1859
Jones, Alexander H.,	1874
Jones, Daniel S.,	1859
Jones, Edward Charles,	1864
Kay, Isaac H.,	1870
Keasbey, H. G.,	1873
Keeney Caleb R.,	1868
Keys, Roger,	1868
Kline, Mahlon N.,	18 6
Koch, Louis,	1872
Kolp, Christopher Henry,	1876
Krewson, William Egbert,	1875
Lippincott, Henry B.,	1868
Magill, Benjamin Morris,	1876
Maisch, John M.,	1856
Mason, Frederick E.,	1871
Mattern, William Kline,	1876
Mattison, Richard V.,	1873
McIntyre, William,	1868
McKelway, George Irvin,	1874
Mellor, Alfred,	1864
Miller, Adolphus W.,	1868
Milligan, Decatur,	1867
Mitchell, Charles L.,	1874
Moore, Joachim Bonaparte,	1860
Moorhead, William Walker,	1876
Needles, Caleb H.,	1868
Newbold, Thomas M.,	1876
Ottinger, James J.,	1876
Parrish, Clemmons,	1868
Parrish, Dillwyn,	1857
Patterson, James Lemon,	1876
Perot, T. Morris,	1857
Pile, Wilson H.,	1857
Power, Frederick B.,	1872
Preston, David,	1868
Procter, Wallace,	1874
Remington, Joseph P.,	1867
Riley, Charles W.,	1868
Rittenhouse, Henry N.,	1857
Robbins, Alonzo,	1865
Roche, Edward Manning,	1868
Roche, William Ford,	1868
Rosengarten, Mitchell G.,	1869
Scattergood, George J.,	1860
Selfridge, Matthew M.,	1858
Shivers, Charles,	1860
Shinn, James Thornton,	1860
Shoemaker, George Y.,	1862
Shoemaker, Joseph L.,	1867
Shoemaker, Richard M.,	1869
Shryock, Allen,	1868
Simpers, J. Wilmer,	1874
Snowdon, George M.,	1857
Souder, Joseph A.,	1870
Spannagel, Charles C.,	1874
Taylor, Alfred B.,	1852
Taylor, Henry Burnes,	1876
Thompson, William B.,	1858
Tilge, Frederick A.,	1868
Trimble, Henry,	1876
Troth, Samuel F.,	1857
Vogelbach, Hermann Augustus,	1868
Warner, William R.,	1857
Weaver, J. Thornton,	1868
Webb, William H.,	1867
Weber, William,	1872
Weidemann, Charles A.,	1868
Wendel, Henry Edward,	1873
Wiegand Thomas S.,	1857
Wilder, Hans M.,	1866
Wilson, Adam H.,	1859
Wright, Archibald W.,	1868

Allegheny City.

Brill, William H.,	1872
Eggers, Frederick Hermann,	1872
Lutz, Harrison S.,	1872

Beaver, Beaver Co.

Andriessen, Hugo,	1875

Bethlehem.

Luckenback, Edward Hermann,	1870
Meyers, Edward Tobias,	1867
Rau, Eugene A.,	1870

Carlisle.

Horn, Wilbur F.,	1876

Chambersburg.

Cressler, Charles H.,	1868
Heyser, William, Jr.,	1856

Columbia.

Meyers, James Alfred,	1867

Easton.

Weaver, John A.,	1873

Erie.

Nick, William Frederick, Jr.,	1869

Harrisburg.

Finney, Thomas J.,	1874
George, Charles T.,	1873
Miller, Jacob Augustus,	1873

Hyde Park.

Morgan, B. G.,	1876

Lancaster.

Heinitsh, Charles A.,	1857
Hubley, Alfred A.,	1870

Lebanon.

Kareh, Joseph J.,	1876
Lemberger, Joseph L.,	1858

Lewisburg.

Schaffle, S. W. W.,	1876

Mansfield, Allegheny Co.

Christy Robert,	1871

Marietta.

Wike, Albert D.,	1876

Meadville.

Sorensen, Sophus,	1872

Minersville.

Burns, J. Kellar,	1876

Oil City.

Griffith, Albert R.,	1870

Pittsburg.

Abel, Joseph,	1864
Caldwell, Joseph F.,	1872
Cherry, James B.,	1868
Holland, S. S.,	1876
Hostetter, Charles M.,	1870
Kerr, James, Jr.,	1876
Ottinger, Franklin,	1871
Rankin, Alfred J.,	1864

Pittston.

Rhoads, Stephen H.,	1876

Pottstown.

Cunningham, John McCoy,	1867

Pottsville.

Kennedy, George Washington,	1869

Quakertown.

Penrose, Stephen F.,	1871

Reading.

Raser, John B.	1872
Stein, Jacob H.,	1869
Ziegler, Philip Milton,	1867

Sharon, Mercer Co.

Dame, S. P.,	1876

Tamaqua.

Albrecht, Emil,	1875

Towanda.

Porter, Henry C.,	1869

Wilkesbarre.

Holmes, Clay W.,	1873

Williamsport.

Cornell, Edward A.,	1873
Duble, Jesse Balderston,	1870

York.

Smith, William, ... 1873

RHODE ISLAND.

East Greenwich.

Congdon, Albert J., . . . 1860

Newport.

Blackman, Lyman Rawson, . 1865
Cotton, William Henry, . . 1875
Frost, William A., . . . 1875
Taylor, James Henry, . . 1875

Providence.

Blanding, William B., . . 1875
Boutelle, William E., . . 1876
Calder, Albert L., . . . 1859
Cone, John W., ... 1876
Davis, George W., . . . 1875
Mason, Norman Nelson, . . 1875
Phillips, Francis James, . . 1875
Reynolds, William K., . . 1876

Westerley.

Lattimer, Robert F., . . . 1857

Wyoming.

Greene, George E., . . . 1875

SOUTH CAROLINA.

Aiken.

Harbers, William Henry, . 1875

Charleston.

Aimar, George Washington, . 1874
Burnham, Edward S., . . 1874
Eckel, Augustus W., . . 1874
Gibson, William A., . . 1874
Luhn, Gustavus Johann, . . 1873
Michaelis, Charles Otto, . . 1874
Moise, B. F., ... 1876
Pauknin, Charles F., . . 1874

TENNESSEE.

Bolivar.

Larwill, Joseph H., Jr., . . 1858

Knoxville.

Albers, George W., . . . 1872

Memphis.

Fahlen, James, . . . 1876
Hampson, Hugh H., . . 1869
Hoerner, Theodore, . . . 1871
Robinson, James S., . . 1869
Safford, William B., . . 1875
Steever, Henry C., . . . 1865

Nashville.

Ewing, William G., . . . 1872
Haddox, James B., . . . 1876
Laurent, Eugene L., . . 1872
Thomas, James, Jr., . . 1875
Wharton, John Criddle, . . 1872
Wharton, William H., . . 1876

TEXAS.

Austin.

Morley, William J., . . 1876

Dallas.

Connor, L. Myers, . . . 1874

Fort Worth.

Powell, Thomas W., . . 1874

Galveston.

Thompson, T. C., . . . 1876

VERMONT.

Brandon.

Crossman, George A., . . 1872

Burlington.

Van Patten, William J., . . 1876

Ludlow.

Sherman, Linus Etias, . . 1875

Morrisville.

Gates, Amasa O., . . . 1876

Rutland.

Higgins, Albert W., . . 1870
Lewis, Elam C., . . . 1870

St. Johnsbury.

Bingham, Charles Calvin, . 1875
Randall, George Dallas, . . 1875

Vergennes.

Young, John Edward,	1875

West Rutland.

Morse, F. A.,	1876

Windsor.

Paine, Milton Randall,	1875

VIRGINIA.

Alexandria.

Lunt, Samuel H.,	1873
Stabler, Richard H.,	1856

Fredericksburg.

Hall, Marshall C.,	1870

Harrisonburg.

Avis, James L.,	1873

Lynchburg.

Craighill, Edward A.,	1876
Lumsden, Charles H.,	1875
Strother, William A.,	1874

Norfolk.

Burgess, Edward,	1876
Burrow, John W.,	1873
Masi, Frederick Henry,	1873
Taylor, William A. S.,	1873
Underhill, Charles F.,	1876

Petersburg.

Goodwyn, John W.,	1873

Richmond.

Anthony, Joseph,	1873
Baker, Thomas Roberts,	1873
Blunt, Ira Washington,	1873
Bodeker, Henry,	1873
Conrad, William Alexander S.,	1873
Dove, John Edwin,	1873
Dupuy, Powhatan Eldridge,	1873
Farrar, Samuel Wesley,	1873
Fischer, Hermann Emil,	1873
Meade, Richard Hardaway,	1873
Miller, Polk,	1876
Nesbitt, Charles Albert,	1873
Nolting, Adolphus William, Jr.,	1870
Purcell, John B.,	1875
Scott, Albert Augustus,	1873
Scott, William Henry,	1873
Taliaferro, E. C.,	1876
Wagner, Louis,	1873
Willis, Joseph Norment,	1873

WEST VIRGINIA.

Charleston.

Boggs, Edwin L.,	1872

Wheeling.

Bocking, Edmund,	1874
Hartung, H. R.,	1876
Young, Alexander S.,	1876

WISCONSIN.

Beloit.

Collins, Charles Frederick Gove,	1859

Fond du Lac.

Curren, Edward S.,	1869

Janesville.

Heimstreet, Edward Burton,	1874

Kenosha.

Prentice, F. F.,	1876

Maxomanie.

Senier, Alfred,	1869
Senier, Alfred, Jr.,	1874
Senier, Frederick S.,	1874

Milwaukee.

Drake, John R.,	1860
Schranck, Henry C.,	1876

Watertown.

Eberle, Herman T.,	1875

DOMINION OF CANADA.

QUEBEC.

Montreal.

Gray, Henry R., ... 1867
Lyman, Benjamin, . . . 1875
Lyman, Stephen Jones, . . 1875

ONTARIO.

Belleville.

Yeomans, L. W., . . . 1876

Caledonia.

Walker, John A., . . . 1873

Guelph.

Petrie, Alexander Bain, . . 1867

Lindsay.

Gregory, Edmund, . . . 1875

London.

Bowman, James, . . . 1876
Saunders, William, . . . 1860

Stratford.

Waugh, George J., . . . 1862

Toronto.

Rose, Henry J., . . . 1872

WEST INDIES.

BERMUDA.

Hamilton.

Heyl, James B., . . . 1863

CUBA.

Cardenas.

Cahill, John F., . . . 1870

U. S. OF COLOMBIA.

Panama.

Herbruger, Florence C., . . 1867

NICARAGUA.

Granada.

Guzman, Horace, . . . 1871

ALPHABETICAL LIST OF MEMBERS.

Abel, Joseph, Pittsburg, Pa.
Abel, Walter B., Philadelphia, Pa.
Abernethy, Maxwell, Jersey City, N. J.
Aimar, George Washington, Charleston, S. C.
Albers, George W., Knoxville, Tenn.
Albrecht, Emil, Tamaqua, Pa.
Alder, Charles P., Springfield, Mass.
Alexander, Maurice W., St. Louis, Mo.
Alsdorf, John, New York City, N.Y.
Althans, Charles A., Brooklyn, N.Y.
Ambler, Starr Hoyt, New York, N.Y.
Anderson, Samuel, Bath, Me.
Andrews, George W., Baltimore, Md.
Andriessen, Hugo, Beaver, Beaver County, Pa.
Angney, John R., Philadelphia, Pa.
Anthony, Joseph, Richmond, Va.
Appleton, George J., Keene, N. H.
Armstrong, A. M., Akron, O.
Ash, Matthew F., Jackson, Miss.
Atkinson, Albert J., Newburyport, Mass.
Atwood, Charles Henry, Boston, Mass.
Atwood, Hermon W., New York.
Atwood, Luther Lee, Pittsfield, Mass.
Austin, George W., Jackson, Mich.
Averill, William Henry, Frankfort, Ky.
Avis, James L., Harrisonburg, Va.
Ayers, James M., St. Louis, Mo.
Babcock, James F., Boston, Mass.
Babo, Leopold, Boston, Mass.
BADGER, CHARLES W., Newark, Mass.
Bailey, Frederick, Lowell, Mass.
Bain, Adrian W., Cincinnati, O.
Baker, Edwin, Shelbourne Falls, O.
Baker, Thomas Roberts, Richmond, Va.
Bakes, William C., Philadelphia, Pa.
Baldus, William Theodore, Washington, D. C.
Ball, Theophilus B., Ironton, O.
Ballard, George S., Utica, N. Y.
Ballard, John W., Davenport, Iowa.
Balluff, Paul, New York.
Balser, Gustavus, New York.
Baltzly, Z., Massillon, O.
Bang, Charles, St. Louis, Mo.
Bannvart, Charles A., Washington, D. C.
Barnaby, James Otis, Brooklyn, N.Y.
Barnaby, Thomas J., Elizabeth, N. J.
Barr, Peter H., Alliance, O.
Barry, Daniel E., Boston, Mass.
Bartlett, Nicholas Gray, Chicago, Ill.
Bartlett, William Williams, Boston, Mass.
Bassett, Charles Harrison, Boston, Mass.
Bassett, Francis M., Brooklyn, N.Y.
Bassett, John W., Tomkinsville, L. I., N. Y.
Bauer, Louis G., Philadelphia, Pa.
Baxley, Jackson Brown, Baltimore, Md.
Bayley, Augustus R., Cambridgeport, Mass.
Beam, Isaac Richard, Baltimore, Md.
Becker, Charles, Georgetown, D. C.
Bedford, P. Wendover, New York.
Belden, James L., Sandbank, N. Y.
Bell, Gotthard Emanuel, Louisville, Ky.

Belt, Z. James, Wilmington, Del.
Berrian, George W., Jr., North Andover, Mass.
Best, John, Central City, Col.
Bertolett, William J., Shreve, O.
Biddle, Charles Johnson, Philada.
Bidwell, Marshall Spring, Elmira, N. Y.
Billings, Henry M., New York.
Bingham, Charles C., St. Johnsbury, Vt.
Biroth, Henry, Chicago, Ill.
Bischof, Albert Sigismund, New York.
Bissell, John G., Rome, N. Y.
Blackman, Lyman R., Newport, R. I.
Blair, Andrew, Philadelphia, Pa.
Blair, Henry C., Philadelphia.
Blake, Amos R., St. Louis, Mo.
Blake, James E., New Bedford, Mass.
Blanding, William B., Providence, R. I.
Blank, Alois, St. Louis, Mo.
Blatchford, Eben, Rockport, Mass.
Blatterman, George W., Maysville, Ky.
Blickhahn, George F., St. Louis, Mo.
Blinkhorn, George, Philadelphia, Pa.
Blocki, William F., Chicago, Ill.
Blunt, Ira Washington, Richmond, Va.
Bocking, Edmund, Wheeling, W. Va.
Bodeker, Henry, Richmond, Va.
Boehm, Solomon, St. Louis, Mo.
Boggs, Edwin L., Charleston, W. Va.
Bolles, William, Boston, Mass.
Bond, James R., New York.
Booth, Clarence, Brooklyn, N. Y.
Borell, Henry Augustus, Philada., Pa.
Borcherdt, Julius C., Chicago, Ill.
Boring, Edwin McCurdy, Phila., Pa.
Borland, Matthew Wilson, Chicago, Ill.
Bossler, David Jervis, Philada., Pa.
Boutelle, William E., Providence, R. I.
Bower, Henry, Philadelphia, Pa.
Bower, Henry A., Philadelphia, Pa.
Bowker, James, Philadelphia, Pa.
Bowman, James, London, Ont., Can.,
Boyce, Samuel F., Chillicothe, O.
Boyd, Abraham, Columbus, O.
Boyden, Ashel, Boston, Mass.
Boyden, Edward Cleveland, Boston, Mass.
Boynton. Herschell, Biddeford, Maine.
Brack, Charles, Baltimore, Md.
Brackett, Aurick S., Virginia City, Nev.
Brill, William H., Allegheny City, Pa.
Broughton, A. J., Rome, N. Y.
Brown, Albert P., Camden, N. J.
Brown, Alexander E., Baltimore, Md.
Brown, Charles Scott, Boston, Mass.
Brown, George R., Poughkeepsie, N. Y.
Brown, Joseph John, San Francisco, Cal.
Brown, Joseph Taylor, Boston, Mass.
Brown, Joseph Taylor, Jr., Boston, Mass.
Brown, Robert J., Leavenworth, Kan.
Brown, William H., Baltimore, Md.
Bruguier, Francis, Newark, N. J.
Buck, George, Chicago, Ill.
Buck, John, Chelsea, Mass.
Buck, John T., Jackson, Miss.
Buehler, Edward Handy, New York.
Bugge, Andreas Valdemar, New Orleans, La.
Bullock Charles, Philadelphia, Pa.
Buntin, William C., Terre Haute, Ind.
Bunting, Samuel S., Philada., Pa.
Burbank, George G., Worcester, Mass.
Burdge, Jacob U., New York.
Burgess, Edward, Norfolk, Va.
Burk, William B., Philadelphia, Pa.
Burnett Joseph, Boston, Mass.
Burnham, Edward S., Charleston, S. C.
Burnham, George H., Hudson, Mass.
Burns, J. Kellar, Minersville, Pa.
Burrough, Edward Ewalt, Baltimore, Md.
Burroughs, S. M., Medina, N. Y.
Burrow, John W., Norfolk, Va.
Bury, Edw. Buckly, Washington, D.C.

Bush, William, Worcester, Mass.
Butler, Freeman Hall, Lowell, Mass.
Button, Elijah, Annapolis, Md.
Cady, Hiram Walworth, Plattsburg, N. Y.
Cahill, John F., Cardenas, Cuba.
Calder, Albert L., Providence, R I.
Caldwell, Joseph F., Pittsburg, Pa.
Caldwell, James M., Philadelphia, Pa.
Caldwell, James W., Detroit, Mich.
Campbell, Horace W., New York.
Campbell, Hugh, Philadelphia, Pa.
Campbell, Isaac Towle, Boston, Mass.
Campbell, Samuel, Philadelphia, Pa.
Candidus, Philip C., Mobile, Ala.
Canning, Henry, Boston, Mass.
Carey, Edward Franklin, Haverhill, Mass.
Carey, George H., Louisville, Ky.
Carle, John, Jr., New York.
Carpenter, George W., Philada., Pa.
Carrell, Eugene A., Morristown, N. J.
Carter, Solomon, Boston, Mass.
Casper, Thomas J., Springfield, O.
Cassebeer, Henry A., New York.
Cassebeer, Henry A., Jr., New York.
Catlin, Ephron, St. Louis, Mo.
Catlin, Theron, St. Louis, Mo.
Chadwick, Alexander B., Brooklyn, N. Y.
Chamberlain, Guilford T., St. Louis, Mo.
Chamberlain, Humphrey B., Syracuse, N. Y.
Chandler, Charles F., New York.
Chapmas, Foster S., Augusta, Ga.
Chapman, Samuel, Philadelphia, Pa.
Chase, Charles D., St. Louis, Mo.
Cheney, Judson Rollin, Del Norte, Col.
Cherry, James B., Pittsburg, Pa.
Childs, Louis Marshall, Greenfield, Mass.
Chipman, Edward D., Philadelphia.
Christiani, Charles, Washington, D C.
Christiani, Theodore, Washington, D. C.
Christy, Robert, Mansfield, Pa.
Clark, Albert B., Jr., Galesburg, Ill.
Clark, John M., Milledgeville, Ga.
Close, George C., Brooklyn, N. Y.
Close, Eldridge W., New York.
Clough, Thomas R., Medford, Mass.
Cochran, Samuel W., Camden, N. J.
Colby, Frank A , Lancaster, N. H.
Colcord, Samuel Marshall, Boston, Mass.
Cole, Theodore, New York.
Colgan, John, Louisville, Ky.
Collins, Charles F. G., Beloit, Wis.
Colton, James B., Boston, Mass.
Cone, John W., Providence, R. I.
Congdon, Albert J., East Greenwich, R. I.
Conner, Jefferson S., New Albany, Ind.
Connor, James F., St. Louis, Mo.
Connor, L. Myers, Dallas, Texas.
Conrad, William A. S., Richmond, Va.
Coombe, Thomas R., Philadelphia.
Cook, George L., Port Jervis, N. Y.
Cook, John G., Lewiston, Me.
Cook, William A., Washington, Iowa.
Cornell, Edward A., Williamsport, Pa.
Cotting, W. A , Milledgeville, Ga.
Cotton, William H., Newport, R. I.
Covell, Thos Jefferson, Denver, Col.
Cowdin, George Henry, Somerville, Mass.
Craig, John Smith, Boston, Mass.
Craighill, Edward A., Norfolk, Va.
Cramer, Henry, Philadelphia
Crawford, William Harper, St. Louis, Mo.
Crawley, Francis Xavier, St. Louis, Mo.
Cressler, Charles H , Chambersburg,
Creuse, Jules L. A., New York.
Cromwell, Zachariah S., Washington, D. C.
Crossman, George A., Brandon, Vt.
Cummings, Henry T., Portland, Me.
Cunningham, John M., Pottstown, Pa.
Currie, John H., New York.
Curren, Edward S., Fond du Lac, Wis.
Curtis, Lebbens, Searsport, Me.

Curtiss, Charles G., Brooklyn, N. Y.
Curtman, Charles O., St. Louis, Mo.
Cusack, Robert, Jersey City, N. J.
Cutler, Edward Waldo, Boston, Mass.
Cutler, John N., Albany, N Y.
Cutts, Foxwell C., Jr., Brooklyn, N.Y.
Daggett, Alfred, Jr., New Haven, Conn.
Daggett, Henry, New Haven, Conn.
Dale, Frank C., Logansport, Ind.
Dalrymple, Charles H., Morristown, N. J.
Dame, S. P., Sharon, Mercer Co., Pa.
D'Amour, Otto, St. Louis, Mo.
Daniels, John B., Atlanta, Ga.
Daniels, Samuel Olney, Natick, Mass.
Davis, George W., Providence, R. I.
Davis, Benjamin, New York, N. Y.
Davis, Vincent, Louisville, Ky.
Dawson, Edward Seymour, Jr., Syracuse, N. Y.
Day, Carlos E., Brooklyn, N. Y.
Day, Charles W., Champaign, Ill.
Day, Walter De Forrest, New City, N. Y.
Daycock, William Henry, Brooklyn, N. Y.
Dearborn, George L., New Market, N. H.
Dege, George F., New City, N. Y.
De La Cour, Joseph Lauriat, Camden, N. J.
Delavallade, John M., Plaquemines, La.
Denham, Charles Sumner, Rockland, Mass.
Dennin, Charles, Brooklyn, N. Y.
Devendorf, Almond Smith, Galesburg, Ill.
Diehl, Conrad Lewis, Louisville, Ky.
Dikeman, Nathan, Waterbury, Conn.
Dimock, Robert H., Waterbury, Conn.
Ditman, Andrew J., New City, N. Y.
Dobbins, Edward T., Philadelphia.
Dohme, Charles Emile, Baltimore, Md.
Dohme, Louis, Baltimore, Md.
Doliber Thomas, Boston, Mass.
Donnell, J. Woodbury, Richmond, Me.
Donavin, Matthew W., Baltimore, Md.
Doolittle, Erastus Hubbard, Boston.
Dougherty, Samuel E., Jersey City, N. J.
Douglass, Henry, Jr., Brooklyn, N. Y.
Dove, John Edwin, Richmond, Va.
Drake, Charles W., Middleboro, Mass.
Drake, John R., Milwaukee, Wis.
Drake, Jonathan B., Elizabeth, N. J.
Dreher, Ernest, Newark, N. J.
Drew, John Waters, Washington, D. C.
Drury, Linus Dana, Boston.
Dryer, James W., Indianapolis, Ind.
Duble, Jessie Balderston, Williamsport, Pa.
Duckett, W. G., Washington, D.C.
Dufour, Clarence R., Washington, D. C.
Duncan, Jefferson E , Boston.
Dung, Albert C., New York, N. Y.
Dunk, Alfred A., East Saginaw, Mich.
Dunn, John A., Brooklyn, N. Y.
Dupuy, Eugene, Brooklyn, N. Y.
Dupuy, Powhatan Eldridge, Richmond, Va.
Dyer, Joseph Howes, Boston.
Dyson, Dunbar S., Bloomington, Ill.
Eareckson, Edwin, Baltimore, Md.
Eastman, Charles Smith, Concord, N. H.
Easton, Luther Waite, Rockland, Mass.
Eaton, Charles Irving, Boston, Mass.
Eberbach, Ottmar, Ann Arbor, Mich.
Ebert, Albert Ethelbert, Chicago, Ill.
Eberle, Charles Louis, Philada., Pa.
Eberle, Herman T., Watertown, Wis.
Eckel, Augustus W., Charleston, S. C.
Eddy, Henry C., Philadelphia, Pa.
Eger, George, Cincinnati, O.
Eggers, Frederick H., Allegheny City, Pa.
Eimer, Charles, New York, N. Y.
Eldridge, George W., Philadelphia, Pa.
Elliott, Henry Alexander, Baltimore, Md.

Ellis, Evan T., Philadelphia, Pa.
Emich, Columbus Valentine, Baltimore, Md.
England, Robert, Philadelphia, Pa.
Entwisle, William Burton, Washington, D. C.
Erben, John S., Philadelphia, Pa
Estes, Joseph Joselyn, Rockland, Mass.
Evans, William, Jr., Philadelphia, Pa.
Ewing, William G., Nashville, Tenn.
Eyster, Christopher Edward, Yankton, Dakota Ter.
Faber, John, New York, N. Y.
Fahlen, James, Memphis, Tenn.
Fairbanks, Harlan, Worcester, Mass.
Fairchild, Benjamin Thomas, New York, N. Y.
Farrar, Samuel Wesley, Richmond, Va.
Featherston'h Edward R., Ravenna, Mercer Co., Mo.
Feemster, Joseph H., Cincinnati, O.
Fennel, Adolphus, Cincinnati, O.
Fenner, William R., Rome, Ga.
Ferguson, Robert Benedict, Washington, D. C.
Ferree, Henry D., Springfield, Mass.
Ferris, Charles E., Lawrenceburg, Ind.
Fickardt, George H., Circleville, O.
Field, Amos, Macon, Mo.
Finlay, Norman J., Jersey City.
Finney, Thomas J., Harrisburg, Pa.
Fischer, Edward J., Buffalo, N. Y.
Fischer, Hermann Emil, Richmond, Va.
Fish, Charles F., Saratoga Springs, N. Y.
Fish, George H., Saratoga Springs, N. Y.
Fisher, William, New York, N. Y.
Flanagan, Lewis Cass, Somerville, Mass.
Flint, John Henry, Marysville, Cal.
Folger, William Swain, Boston, Mass.
Follansbee, Sherman, Boston, Mass.
Foltz, William K., Ashland, O.
Foertmyer, Adolphus W., Cincinnati, O.
Fortier, Zepherin, Fitchburg, Mass.
Foster, Henry B., Concord, N. H.
Fougera, Edmund C., New York, N. Y.
Fowle, Henry D., Boston, Mass.
Fox, Daniel S., Chicago, Ill.
Fox, Peter Paul, Philadelphia, Pa.
Frames, James P., Baltimore, Md.
Fraser, Edward A., New York, N. Y.
Fratz, John G., Cincinnati, O.
Fredigke, Charles Christian, Chicago, Ill.
French, George Washington, Boston, Mass.
Frey, John, New York, N. Y.
Frohwein, Max, New York, N. Y.
Frohwein, Richard, Elizabethport, N. J.
Frohwein, Theobald, New York, N. Y.
Frost, James, Vallejo, Solano Co., Cal.
Frost, John J., Lexington, Ky.
Frost, William A., Newport, R. I.
Frothingham, Edward G., Jr., Haverhill, Mass.
Früh, Carl D. S., Philadelphia, Pa.
Fuller, Henry W., Chicago, Ill.
Fuller, Oliver F., Chicago, Ill.
Fuller, Sumner Howard, Boston, Mass.
Gaillard, Edward, Philadelphia, Pa.
Gale, Edwin O., Chicago, Ill.
Gale, William H., Chicago, Ill.
Gallagher, Charles K., Washington, N. C.
Gallagher, James M., Washington, N. C.
Gardiner, Warren B., New York, N. Y.
Gardner, Robert W., Jersey City, N. J.
Garrigues, Samuel S., East Saginaw, Mich.
Garrison, Herod Daily, Chicago, Ill.
Garver, Alexander, Navarre, O.
Gates, Amasa O., Morrisville, Vt.
Gates, Howard E., Litchfield, Conn.
Gaylord, Henry C., Cleveland, O.
Geiger, Walter P., Canton, O.
Gellatly, William A., New York.
Genois, Louis, New Orleans, La.

George, Charles T., Harrisburg, Pa.
Gerhard, Samuel, Philadelphia, Pa.
Gibson, William A., Charleston, S. C.
Gill, George, Mount Vernon, N. Y.
Gilman, Samuel Kinsman, Boston, Mass.
Gilmore, John W., New York.
Girling, Robert N., New Orleans, La.
Gleeson, James Andrew, Boston, Mass.
Gleeson, Michael Henry, Boston, Mass.
Glenn, Thomas Smith, St. Louis, Mo.
Godding, John Granville, Boston, Mass.
Good, James M., St. Louis, Mo.
Goodman, Charles Frederick, Omaha, Neb.
Goodrich, Stephen, Hartford, Conn.
Goodwin, Lester H., Hartford, Conn.
Goodwin, William W., Newburyport, Mass.
Goodwyn, John W., Petersburg, Va.
Gordon, William John Manchester, Cincinnati, O.
Gordon, Edward Bertelle, Lynn, Mass.
Gossman, Adam J., Baltimore, Md.
Grahame, Israel P., Philadelphia, O.
Graham, William A., Sandusky, O.
Grandjean, Charles, St. Louis, Mo.
Grandjean, Eugene, St. Louis, Mo.
Grant, William R., St. Louis, Mo.
Gray, Francis Marion, Hopkinsville, Ky.
Gray, Henry R., Montreal, Quebec, Canada.
Green, Alexander Alfred, Aurora, Nevada.
Green, Thomas T., New York.
Greene, George E., Wyoming, R. I.
Gregory, Edmund, Lindsay, Ontario, Canada.
Greve, Theodore L. A., Cincinnati, O.
Gridley, Junius, New York.
Grieve, Fleming G., Milledgeville, Ga.
Griffith, Albert R., Oil City, Pa.
Griffith, Hiram E., Niagara Falls, N. Y.
Griffith, Wiiliam H., New York.
Griswold, William Henry, North Adams, Mass.
Grossklaus, John F., Navarre, O.
Grove, John E., Philadelphia, O.
Guerdan, John, St. Louis, Mo.
Guzman, Horace, Granada, Nicaragua.
Haas, George Hermann, Rochester, N. Y.
Haddox, James B., Nashville, Tenn.
Hadley, Frank R., New Bedford, Mass.
Haenchen, Charles Eugene, Phila., Pa.
Haight, William B., Stamford, Conn.
Hale, Frederick, New York City, N.Y.
Hall, Marshall C., Fredericksburg, Va.
Hampson, Hugh H., Memphis, Tenn.
Hance, Edward H., Philadelphia, Pa.
Hancock, Charles W., Philada., Pa.
Hancock, John Francis, Baltimore, Md.
Hancock, John Henry, Philada , Pa.
Harbers, William H., Aiken, S. C.
Harlow, Noah Sparhawk, Bangor, Me.
Harlow, Wickham N., Orange, N. J.
Harner, James M., Brooklyn, N. Y.
Harper, Frank M., Madison, Ind.
Harrington Frank, Logan, O.
Harrop, Joseph W., Leavenworth, Kansas.
Hartness, William H., Cleveland, O.
Hartung, H. R., Wheeling, W. Va.
Harwood, Frank Lucian, Warren, Mass.
Harwood, Lucian, Warren, Mass.
Hassencamp, Ferdinand, Baltimore, Md.
Hatch, Frederick A., Boston, Mass.
Hatfield, Vermont, Middletown, O.
Havenstein, Alexander, Newark, N.J.
Haviland Henry, New York.
Hawkins, M. Smith, Salem, Columbiana Co., O.
Hay, Henry H., Portland, Me.
Hays, David, New York City.
Hazard, Thomas H., Philadelphia, Pa.
Hazlett, Edward Everett, Phila., Pa.
Hebberling, Gottfried, New York City.
Heimstreet, Edward Burton, Janesville, Wis.

Heinemann Otto, Cincinnati, Ohio.
Heinitsh, Charles A., Lancaster, Pa.
Heintzelman, Joseph A., Philada., Pa.
Heller, Peter Henry, Washington, D. C.
Helman, Charles M., Cincinnati, O.
Henchman, Daniel, Boston, Mass.
Henes, William F., New York.
Henrich, George, Mascoutah, Ill.
Hensel, Samuel T., St. Louis, Mo.
Hepburn, John, Flushing, N. Y.
Herbruger, Florence C., Panama, U. S. of Colombia.
Heuerman, Henry W., Chicago, Ill.
Heyl, James B., Hamilton, Bermuda.
Heydenreich, Emile, Brooklyn, N. Y.
Heydenreich, F. Victor, Brooklyn, N. Y.
Heylman, Charles, Chicago, Ill.
Heyser, William, Jr., Chambersburg, Pa.
Hickling, Daniel Percy, Washington, D. C.
Higgins, Albert W., Rutland, Vt.
Higgins, James S., New York.
Hildreth, Charles Francis P., Allentown, N. H.
Hill, Alfred C., Cincinnati, O.
Hill, Frank P., Elyria, O.
Hill, Hiram H., Cincinnati, O.
Hisner, Henry C. W., Fort Wayne, Ind.
Hinsdale, Samuel J., Fayetteville, N. C.
Hitchcock, William Edwin, Newark, N. J.
Hoagland, Pratt Ralph, Boston, Mass.
Hodge, Charles, Portland, Oregon.
Hoerner, Theodore, Memphis, Tenn.
Hoffmann, Frederick, New York.
Hogan, Louis C., Chicago, Ill.
Hohenthal, Charles F. L., New York.
Hohly, Charles, Toledo, O.
Holden, Henry Clay, Windsor Locks, Conn.
Holland, S. P., Pittsburg, Pa.
Holmes, Clay W., Wilkesbarre, Pa.
Holt, Alvin E., Chicago, Ill.
Holzhauer, Charles, Newark, N. J.
Hood, Charles I., Lowell, Mass.
Hooper, John H., Chicago, Ill.
Hopp, Lewis C., Cleveland, O.
Horn, Wilbur F., Carlisle, Pa.
Horton, William Francis, Boston, Mass.
Hostetter, Charles M., Pittsburg, Pa.
Hottendorf, Augustus, Cincinnati, O.
Howard, George Montgomerie, Washington, D. C.
Howarth, John W., Utica, N. Y.
Howson, Walter H., Chillicothe, O.
Hoyt, George Melvin, Boston, Mass.
Hubbard, John H., Cambridge, Mass.
Hubley, Alfred A., Lancaster, Pa.
Huddart, John F., Louisville, Ky.
Hudnut, Alexander, New York.
Hughes, Henry Arnold, Louisville, Ky.
Huling, Bruce, Cleveland, O.
Hunt, Henry H., Ballston Spa, N. Y.
Hunt, James L., Hingham, Mass.
Hurst, John C., Philadelphia, Pa.
Huston, Charles, Columbus, O.
Hyler, William Henry, Port Chester, N. Y.
Imhof, Henry, New York.
Ingalls, Albert O., Fort Scott, Kan.
Ingalls, John, Macon, Ga.
Ink, Parker P., Washington, Iowa.
Jackson, James M., Philadelphia, Pa.
Jackson, Vincent Rodman, Baltimore, Md.
Jacobus, Judson S., Chicago, Ill.
Jacques, Isaac W., Newark, N. J.
Jacques, George W., South Amboy, N. J.
Jaggar, Charles H., Nantucket, Mass.
James, George R., Schoolcraft, Mich.
James, Thomas P., Cambridge, Mass.
Jamieson, Thomas N., Chicago, Ill.
Jarrett, Henry T., New York.
Jauncey, William, Chicago, Ill.
Jefferson, Charles L., Philadelphia, Pa.
Jefferson, John H. B., Baltimore, Md.
Jefferson, William E., Fredricktown, O.
Jenkins, Luther Lincoln, Boston, Mass.

Jenks, Thomas L., Boston, Mass.
Jenks, William J., Philadelphia, Pa.
Jennings, Nathaniel Hynson, Baltimore, Md.
Jesson, Jacob, Pentwater, Mich.
Johnson, Benjamin F., Philada., Pa.
Johnson, Charles B., Middletown, O.
Johnson, Edward L., New York.
Johnston, William, Detroit, Mich.
Jones, Alexander H., Philada., Pa.
Jones, Charles Kendall, St. Louis, Mo.
Jones, Charles Mortimore, Manchester, N. H.
Jones, Daniel S., Philadelphia, Pa.
Jones, Edward Charles, Philada., Pa.
Jones, James Taber, Boston, Mass.
Jones, Simon Newton, Louisville, Ky.
Jones, Thomas, Brooklyn, N. Y.
Jones, William Henry, Boston, Mass.
Jordan, William H., Portland, Me.
Judge, John F., Cincinnati, O.
Kalb, Theodore, St. Louis, Mo.
Kalish, Julius, New York City, N.Y.
Karch, Joseph J., Lebanon, Pa.
Karrmann, William, Cincinnati, O.
Kay, Isaac H., Philadelphia, Pa.
Keasby, H. G., Philadelphia, Pa.
Keeler, William H., Saginaw City, Mich.
Keeney, Caleb R., Philadelphia, Pa.
Keeshan, John, Cincinnati, O.
Keffer, William P., New Orleans, La.
Kelley, Edward F., Sandbank, N. Y.
Kelley, Edward Sam., Boston, Mass.
Kelsey, Henry J., New Haven, Conn.
Kennedy, George Washington, Pottsville, Pa.
Kent, Robert R., Boston, Mass.
Kerr, James, Jr., Pittsburg, Pa.
Kettell, George Parker, Charlestown, Mass.
Keys, Roger, Philadelphia, Pa.
Kidder, Samuel, Jr., Lowell, Mass.
Kidwell, John Lawrence, Washington, D. C.
Kielhorn, Henry, Indianapolis, Ind.
Kiersted, Henry T., New York.
Kimmel, Henry, New York.
King, James Theodore, Middletown, N. Y.
Kirkbride, Jos. Cooper, St. Louis, Mo.
Kirsten, Adolph, Jersey City, N. J.
Kitchen, Charles W., Brooklyn, N.Y.
Kleinschmidt, A. Alexander, Baltimore, Md.
Kline, Mahlon N., Philadelphia, Pa.
Klussmann, H., Hoboken, N. J.
Knabe, G. A., Washington, D. C.
Knowlson, Alexander M., Troy, N.Y.
Koch, Louis, Philadelphia, Pa.
Koehnken, Herman Henry, Cincinnati, O.
Kolp, Christopher Henry, Phila., Pa.
Krebs, Hugo, St. Louis, Mo.
Krehbiel, Gustavus, New York City, N. Y.
Krewson, William Egbert, Phila., Pa.
Krieger, Philip, Brooklyn, N. Y.
Krusemarck, Charles, Chicago, Ill.
Krummeck, Jacob, Santa Fé, New Mexico.
Kuhles, Philip, New York.
Laird, William R., Jersey City, N. J.
Lambe, John J., Hartford, Conn.
Lamberton, J. F., Saratoga Springs, N. Y.
Land, Robert H., Augusta, Ga.
Lane, Alfred S., Rochester, N. Y.
Langebecker, Charles O., Gretna, La.
Larwill, Jos. H., Jr., Bolivar, Tenn.
Lattimer, Robert F., Westerley, R. I.
Lauer, Michael John, Baltimore, Md.
Laurent, Eugene L., Nashville, Tenn.
Lautenbach, Robert, Baltimore, Md.
Lawlor, Charles J., Brooklyn, N. Y.
Lawton, Charles H., New Bedford, Mass.
Lawton, Horace A., New Bedford, Mass.
Laycock, Washington, Rondout, N.Y.
Lazell, Lewis T., New York City.
Leary, Jeremiah Thomas, Boston, Mass.
Lee, Addison Sherwin, Raleigh, N. C.
Lee, Emmor H., Camden, N. J.
Lee, James A., New Iberia, La.

Lehlbach, Paul Frederick, New York.
Lehn, Louis, New York.
Leis, George, Lawrence, Kan.
Leitch, Arthur, St. Louis, Mo.
Lemberger, Joseph L., Lebanon, Pa.
Levering, P. Wharton, Jersey City, N. J.
Lewis, Elam C., Rutland, Vt.
Lewis, Samuel Edwin, Washington, D. C.
Lewis, Thomas, Brooklyn, N. Y.
Lillie Chas., Great Barrington, Mass.
Lilly, Alonzo, Jr., Baltimore, Md.
Lilley, James E , Evansville, Ind.
Lincoln, Henry Ware, Hingham, Mass.
Lingelbach, Ferd., Louisville, Ky.
Lippincott, Henry B., Philada., Pa.
Littell, William M., Newark, N. J.
Littlefield, Alvah, Boston, Mass.
Littlefield, Chauncey Bonney, Manchester, N. H.
Livingston, Benjamin V. B., Brooklyn, N. Y.
Llewellyn, John Frederick, Mexico, Adrian County, Mo.
Lloyd, John Uriah, Cincinnati, O.
Lobstein, J. F. Daniel, Sag Harbor, N. Y.
Loomis, John Clarence, Jeffersonville, Ind.
Lowd, John Colby, Boston, Mass.
Lowden, John, Boston, Mass.
Luckenback, Edward H., Bethlehem, Pa.
Ludlow, Charles, Springfield, O.
Luhn, Gustavus Johann, Charleston, S. C.
Lumsden, Chas. H., Lynchburg, Va.
Lunt, Samuel H., Alexandria, Va.
Lutz, Harrison S., Allegheny City, Pa.
Lyman, Benjamin, Montreal, Quebec, Can.
Lyman, Stephen Jones, Montreal, Quebec, Can.
Lyons, Isaac L., New Orleans, La.
McAfee, James Alexander, Louisville, Ky.
McAlmont, John J., Little Rock, Ark.
McCarty, William, Morristown, N. J.
McConville, Thomas Aloysius, Worcester, Mass.
McDonald, William, North Adams, Mass.
McDougall, James, Port Jervis, N. Y.
McElhenie, Thomas D., Brooklyn, N. Y.
McInall, Edward, Jr., Wilmington, Del.
McIntyre, Byron F., New York.
McIntyre, Ewen, New York.
McIntyre, William, Philadelphia, Pa.
McKay, George J., Eureka, Humboldt Bay, Cal.
McKelway, George Irvin, Philadelphia, Pa.
McKesson, John, Jr., New York.
McPherson, George, Chicago, Ill.
MacDonald, George, Kalamazoo, Mich.
Macmahon, Thomas Jackson, New York.
Magill, Benjamin Morris, Phila , Pa.
Mahla, Frederick, Chicago, Ill.
Main, Thomas F., New York.
Maisch, John M., Philadelphia, Pa.
Major, John Richards, Washington, D. C.
Mallinckrodt, Edward, St. Louis, Mo.
Mallinckrodt, Gustavus, St. Louis, Mo.
Mangold, George A., New York.
Markoe, George Frederick Holmes, Boston, Mass.
Markward, James, Cincinnati, O.
Marsh, Edward H., New York.
Marshall, Ernest Clifton, Charlestown, Mass.
Marvel, Amos Francis, Taunton, Mass.
Marvin, Thomas Ellison Oliver, Portsmouth, N. H.
Masi, Frederick Henry, Norfolk, Va.
Mason, Frederick E., Philada., Pa.
Mason, Norman Nelson, Providence, R. I.
Masters, T. Edward, Springfield, Mass.
Mattern, William Kline, Philada., Pa.
Mattison, Richard V., Philada., Pa.
May, James O., Naugatuck, Conn.

Mayell, Alfred, Cleveland, O.
Meade, Richard Hardaway, Richmond, Va.
Melchers, Henry, East Saginaw, Mich.
Mellor, Alfred, Philadelphia, Pa.
Mellor, Godfrey K., Jersey City, N. J.
Melvin, James Samuel, Boston, Mass.
Meuninger, Henry J., Brooklyn, N.Y.
Mercein, James R., Jersey City, N. J.
Merrell, William S., Cincinnati, O.
Merrick, John M., Boston, Mass.
Merrill, Charles A., Exeter, N. H.
Merrill, Walter S., Danvers, Mass.
Metcalf, Theodore, Boston, Mass.
Meyer, Christian F. G., St. Louis, Mo.
Meyers, Edward T., Bethlehem, Pa.
Meyers, James A., Columbia, Pa.
Michaelis, Charles Otto, Charleston, S. C.
Milburn, John Alexander, Washington, D. C.
Milhau, Edward L., New York.
Mill, James W., Chicago, Ill.
Milleman, Philip Lionel, Chicago, Ill.
Miller, Adolphus W., Philada., Pa.
Miller, Edward T., Indianapolis, Ind.
Miller, Frederick Christopher, Louisville, Ky.
Miller, George Yenington, Luzerne, Warren Co., N. Y.
Miller, Jacob A., Harrisburg, Pa.
Miller, Louis, Mount Holly, N. J.
Miller, Polk, Richmond, Va.
Milligan, Decatur, Philadelphia, Pa.
Milla, Andrew M., Newark, N. J.
Mingay, James, Saratoga Springs, N. Y.
Mitchell, Charles L., Philadelphia, Pa.
Mitnach, Henry, Baltimore, Md.
Mobley, Cyrus Lyman, Louisville, Ky.
Moffitt, Thomas S , San Francisco, Cal.
Mohr, Charles, Mobile, Ala.
Moise, B. F., Charleston, S. C.
Moith, Augustus Theodore, Fishkill-on-Hudson, N. Y.
Moll, William, Saginaw City, Mich.
Molwitz, Ernest, New York.
Monsarrat, Oscar, Baltimore, Md.
Moody, Richard H., Belfast, Me.
Moore, George, Somersworth, N. H.
Moore, Jacob Faris, Baltimore, Md.
Moore, James Penn, Cleveland, O.
Moore, Joachim Bonaparte, Phila., Pa.
Moorhead, William Walker, Philadelphia, Pa.
Morgan, B. G., Hyde Park, Pa.
Morgan, James, Concord, N. H.
Morgan, Richard Evan, Great Barrington, Mass.
Morley, William J., Austin, Tex.
Morrill, Benjamin, Littleton, N. H.
Morrison, Samuel C., Stamford, Conn.
Morrison, S. Elwood, Baltimore, Md.
Morrison, Thomas O., New York.
Morse, F. A., West Rutland, Vt.
Mueller, Adolphus, Highland, Ill.
Munson, Luzerne J., Waterbury, Conn.
Murray, Francis Marion, Key West, Fla.
Mutchmore, William Fletcher, Basking Ridge, N. J.
Muth, John Philip, Baltimore, Md.
Neal, Leander, Youngstown, O.
Needles, Caleb H., Philadelphia, Pa.
Neergaard, William, New York.
Newbold, Thomas M., Philada., Pa.
Newman, George Abner, Louisville, Ky.
Newman, George A., Brooklyn, N.Y.
Neshitt, Charles Albert, Richmond, Va.
Nichols, Edward Payson, Newark, N. J.
Nichols, Thomas B., Salem, Mass.
Nick, William Frederick, Jr., Erie, Pa.
Nicol, Lewis E., Brooklyn, N. Y.
Niebrugge, John H., Brooklyn, N. Y.
Nietsch, Adolph J. W., Brooklyn, N. Y.
Noble, John J., Newton Centre, Mass.
Nodler, Peter, Covington, Ky.
Nolting, Adolphus William, Jr., Richmond, Va.
Nowell, William F., Boston, Mass.
Noyes, Daniel N., Lee, Mass.

Noyes, Parker Jewett, Lancaster, N. H.
Oatman, Le Roy S., Angola, Erie County, N. Y.
O'Brien, James J., Boston, Mass.
O'Donnel, James Dominic, Washington, D. C.
O'Gallagher, James, St. Louis, Mo.
Ohliger, Lewis P., Wooster, O.
Oldberg, Oscar, Washington, D. C.
Oliver, William M., Elizabeth, N. J.
Ollif, James H., Brooklyn, N. Y.
Orne, Charles Parker, Cambridgeport, Mass.
Orne, Joel Stone, Cambridgeport, Mass.
Orynski, Leonardo, Hannibal, Mo.
Osborne, Hampden, Columbus, Miss.
Osburn, William Henry, Baltimore, Md.
Osgood, Hugh H., Norwich, Conn.
Osmun, Charles A., New York, N. Y.
Ottinger, Franklin, Pittsburg, Pa.
Ottinger, James J., Philadelphia, Pa.
Owens, Richard J., Brooklyn, N. Y.
Paine, James D., Rochester, N. Y.
Paine, Milton Randall, Windsor, Vt.
Painter, Emlen, San Francisco, Cal.
Palmer, Hosea W., Chicago, Ill.
Palmer, John Dabney, Monticello, Florida.
Parcher, George A., Ellsworth, Me.
Parham, Robert, Leavenworth, Kan.
Parker, George H., Andover, Mass.
Parker, Joseph L., Boston, Mass.
Parr, John C., Weston, Mo.
Parrish, Clemmons, Philadelphia, Pa.
Parrish, Dillwyn, Philadelphia, Pa.
Parsons, John, Chicago, Ill.
Partridge, Charles K., Augusta, Me.
Patch, Edgar Leonard, Boston, Mass.
Patten, Ichabod Bartlett, Boston, Mass.
Patten, John F., Bangor, Me.
Patterson, James Lemon, Philadelphia, Pa.
Patterson, Theodore H., Chicago, Ill.
Patton, William Allison, Catlettsburg, Ky.
Pauknin, Charles F., Charleston, S. C.
Pauly, Christian, Jersey City, N. J.
Peabody, William H., Buffalo, N. Y.
Peacock, Frederick S., Atlanta, Ga.
Peck, Anley W., Mount Vernon, N. Y.
Peduzzi, George S., Brooklyn, N. Y.
Peirpoint, Newton, Englewood, Cook County, Ill.
Peixotto, Moses Levi Maduro, New York, N. Y.
Penrose, Stephen F., Quakertown, Pa.
Percy, Frank V., Danbury, Conn.
Perkins, Elisha Henry, Baltimore, Md.
Perkins, William Alexander, Virginia City, Nev.
Perot, T. Morris, Philadelphia, Pa.
Perry, Bayard Taylor, Manchester, N. H.
Perry, Edward Howland, Boston, Mass.
Peter, Arthur, Louisville, Ky.
Peters, Alexander C., Newark, N. J.
Petrie, Alexander Bain, Guelph, Ontario, Canada.
Pettit, Henry M., Leavenworth, Kan.
Pfeiffer, Adolph, St. Louis, Mo.
Pfingst, Edward Charles, Louisville, Ky.
Pfingst, Ferdinand John, Louisville, Ky.
Pfingst, Henry Adolph, Louisville, Ky.
Pfingsten, Gustavus, New York, N. Y.
Phelps, Dwight, West Winstead, Conn.
Phillips, Francis James, Providence, R. I.
Phillips, George W. C., Jersey City, N. J.
Phillips, Walter F., Portland, Me.
Phipps, John Mellen, Monson, Mass.
Physick, Henry Sanford, St. Louis, Mo.
Pickford, Thomas, Wallingford, Conn.
Pile, Wilson H., Philadelphia, Pa.
Pinkham, Alonzo Taylor, Dover, N. H.
Pitt, John R., Middletown, Conn.
Plaisted James H., Waterville, Me.
Plummer, David G., Bradford, Stark County, Ill.

Plummer, George B., Hinsdale, Mass.
Porter, George G., New York, N. Y.
Porter, Henry C., Towanda, Pa.
Post, E., Athens, N. Y.
Potts, Jesse Newport, Baltimore, Md.
Power, Frederick B., Philada., Pa.
Powell, Thos. W., Fort Worth, Texas.
Prentice, F. F., Kenosha, Wis.
Prescott, Albert B., Ann Arbor, Mich.
Prescott, Horace Augustus, Dorchester, Mass.
Preston, Alfred J., Springfield, Mass.
Preston, David, Philadelphia, Pa.
Price, Charles S., Washington, D. C.
Primm, Hubert, St. Louis, Mo.
Procter, Wallace, Philadelphia, Pa.
Proctor, Benjamin, Lynn, Mass.
Pugh, Finley B., Rushville, Ind
Punch, William F., Mobile, Ala.
Purcell, John B., Richmond, Va.
Pyle, Cyrus, Brooklyn, N. Y.
Rackley, Benjamin Franklin, Dover, N. H.
Ramsperger, Gustavus, New York.
Randall, George Dallas, St. Johnsbury, Vt.
Rankin, Alfred J., Pittsburg, Pa.
Rano, Charles O., Buffalo, N. Y.
Rapelye, Charles A., Hartford, Conn.
Raser, John B., Reading, Pa.
Rau, Eugene A., Bethlehem, Pa.
Redfearn, John, Fall River, Mass.
Reichard, F. Alfred, New York.
Reinhold William, Chicago, Ill.
Reinlein, Paul, Cincinnati, O.
Remington, Joseph P., Philada., Pa.
Rendigs, Charles Peter, Cincinnati, O.
Restieaux, Thomas, Boston, Mass.
Reum, Hermann F., Cincinnati, O.
Reynolds, Howard Prescott, Plainfield, N. J.
Reynolds, John J., Louisville, Ky.
Reynolds, William K., Providence, R. I.
Rhoads, Stephen H., Pittston, Pa.
Rice, Charles, New York.
Rice, J. Allen, Milford, Mass.
Richardson, J. Clifford, St. Louis, Mo.
Richardson, Marius D, Lexington, Ky.
Ricker, George Dexter, Boston, Mass.
Rickey, Randal, Trenton, N. J.
Ricksecker, Theodore, New York.
Rideout, James W., Boston, Mass.
Riley, Charles W., Philadelphia, Pa.
Ritson, Alfred, Columbus, O.
Rittenhouse, Henry N., Philada., Pa.
Robbins, Alonzo, Philadelphia, Pa.
Robbins, Charles Abert, New York.
Robbins, Daniel C., New York.
Roberts, Joseph, Baltimore, Md.
Roberts, John S., Columbus, O.
Robinson, James S., Memphis, Tenn.
Roche, Edward Manning, Phila., Pa.
Roche, William Ford, Philada., Pa.
Rogers, Wiley, Louisville, Ky.
Rogers, William Henry, Middletown, N. Y.
Rohrbach, Theodore, Cumberland, Md.
Rollins, John Francis, Fort George, Fla.
Ronnefeld, Theodore, Detroit. Mich.
Rose, Henry J., Toronto, Ontario, Can.
Rosengarten, Mitchell G., Phila., Pa.
Royce, Lucien M., New York.
Ruete, Theodore W., Dubuque, Iowa.
Rumsey, S. L., East Orange, N. J.
Runyon, Edward Wheelock, New York.
Russell, Edward Walton, Baltimore, Md
Russell, Elias Smith, Nashua, N. H.
Russell, Eugene J., Baltimore, Md.
Rust, William, New Brunswick, N. J.
Sackett, Samuel M., Monroe, Mich.
Safford, William Augustus, Lowell, Mass.
Safford, William B., Memphis, Tenn.
Sander, Enno, St. Louis, Mo.
Sands, George G., New York.
Sappington, Richard, Baltimore, Md.
Sargent, Ezekiel Herbert, Chicago, Ill.
Saunders, Richard B., Chapel Hill, N. C.
Saunders, William, London, Ontario, Can.

Scala, William Franklin, Washington, D. C.
Scattergood, George J., Philada., Pa.
Schaaf, Justus Henry, Vidalia, La.
Schaefer, George H., Fort Madison, Iowa.
Schaffle, S. W. W., Lewisburg, Pa.
Schafhirt, Adolph J., Washington, D. C.
Scheffer, Emil, Louisville, Ky.
Scheffer, Henry W., St. Louis, Mo.
Scholz, Philip, St. Louis, Mo.
Schmidt, William George, Louisville, Ky.
Schrader, Henry, Indianapolis, Ind.
Schranck, Henry C., Milwaukee, Wis.
Schreiber, August, Tell City, Ind.
Schroder, Hermann, Quincy, Ill.
Schumann, Theodore, Atlanta, Ga.
Schwab, Louis, Cincinnati, O.
Scofield, James S., New York.
Scott, Albert Augustus, Richmond, Va.
Scott, David, Worcester, Mass.
Scott, Nelson R., Worcester, Mass.
Scott, William Henry, Richmond, Va.
Scott, William J., Cleveland, O.
Scribner, Benjamin Franklin, New Albany, Ind.
Seabury, George J., New York.
Sears, George T., Boston, Mass
Seaward, Daniel W., New York.
Selfridge, Matthew M., Philada., Pa.
Senier, Alfred, Maxomanie, Wis.
Senier, Alfred, Jr., Maxomanie, Wis.
Senier, Frederick S., Maxomanie, Wis.
Sennewald, Ferdinand William, St. Louis, Mo.
Sevin, N. Douglass, Norwich, Conn.
Sewall, David H. Jewett, Boston, Mass.
Sharp, Alpheus Phineas, Baltimore, Md.
Sharp, J. Perin, Chicago, Ill.
Sharples, Stephen Paschell, Boston, Mass.
Shaw, Robert Johnston, Plainfield, N J
Shaw, Stephen F., Rochester, N. H.
Shead, Edward Edes, Eastport, Me.
Shedden, John W., New York.
Sheils, George E., New York.
Sheppard, Samuel Airus D., Boston, Mass.
Sherman, Linus Etias, Ludlow, Vt.
Sherman, Oliver G., Jersey City, N. J.
Sherwood, Hezekiah Shorey, Poughkeepsie, N. Y.
Shinn, James Thornton, Philada., Pa.
Shivers, Charles, Philadelphia, Pa.
Shoemaker Benjamin, Wilmington, Del.
Shoemaker, George Y., Philada, Pa.
Shoemaker, Joseph L., Philada., Pa.
Shoemaker, Richard M., Philada., Pa.
Shriver, Henry, Cumberland, Md.
Shryer, Thomas Wilson, Cumberland, Md.
Shryock, Allen, Philadelphia, Pa.
Shurtleff, Israel H., New Bedford, Mass.
Simms, Giles Green Craycroft, Washington, D. C.
Simpson, William, Raleigh, N. C.
Simpson, William, San Fancisco, Cal.
Simson, Francis Cook, Boston, Mass.
Simpers, J. Wilmer, Philadelphia, Pa.
Singer, Peter J., Peoria, Ill.
Skelly, James T., New York.
Sliter, Albert H., Troy, N. Y.
Sloan, George W., Indianapolis, Ind.
Smalley, Elijah, Boston, Mass.
Smith, Albert A., Chicago, Ill.
Smith, Albert E., Boston, Mass.
Smith, Charles Bradley, Newark, N. J.
Smith, Charles G., Springfield, O.
Smith, Edward A., Baltimore, Md.
Smith, Israel P., Newark, N. J.
Smith, Linton, Wilmington, Del.
Smith, Thomas C., Charlotte, N. C.
Smith, Warren, Chicopee, Mass.
Smith, William, York, Pa.
Snow, Charles W., Syracuse, N. Y.
Snow, Jesse Walker, Boston, Mass.
Snowdon, George M., Philada., Pa.
Snyder, Alva L., Bryan, O.
Snyder, Ambrose C., Brooklyn, N. Y.

Sommers, Richard Miller, Camden, N. J.
Sorensen, Sophus, Meadville, Pa.
Souder, Joseph A., Philadelphia.
Spalding, Walter A., New Haven, Conn.
Spannagel, Charles C., Philada., Pa.
Spenzer, Peter J., Cleveland, O.
Squibb, Edward R., Brooklyn, N. Y.
Squires, C. P., Burlington, Iowa.
Stabler, Richard H., Alexandria, Va.
Stacey, Benjamin Franklin, Charlestown, Mass.
Stamford, William H , Newark, N. J.
Starr, Thomas, New York.
Steele, Henry, San Francisco, Cal.
Steele, James G., San Francisco, Cal.
Steever, Henry C., Memphis, Tenn.
Stein, Jacob H., Reading, Pa.
Steingoetter Henry, Belleville, Ill.
Stephens, William G., Yonkers, N. Y.
Stout, William A., Springfield, O.
Stowell, David, Boston, Mass.
Strassel, William, Louisville, Ky.
Strehl, Louis C., Chicago, Ill.
Streit, Alexander G. F., Okawville, Washington County, Ill.
Strother, William A., Lynchburg, Va.
Sutton, Ellsworth Septimus, Louisville, Ky.
Sutton, Peter Priest, Louisville, Ky.
Sweeney, Robert Ormsby, St. Paul, Min.
Sweet, Henry, Chicago, Ill.
Sylvester, Samuel Retallack, Baltimore, Md.
Taber, Edward Morris, Washington, D. C.
Talbot, James Stewart, Boston, Mass.
Taliaferro, E. C., Richmond, Va.
Tarrant, Homer Post, Augusta, Ga.
Tartis, Alfred J., Brooklyn, N. Y.
Taylor, Alfred B., Philadelphia, Pa.
Taylor, Henry Burnes, Philada., Pa.
Taylor, James Henry, Newport, R. I.
Taylor, John P., New Bedford, Mass
Taylor, Walter Adolphus, Atlanta, Ga.
Taylor, William A. S., Norfolk, Va.
Test, Alfred W., Camden, N. J.
Thatcher, Joseph Haven, Portsmouth, N. H.
Thatcher, Hervey D., Potsdam, N. Y.
Thayer, Henry, Cambridgeport, Mass.
Thibodeaux, Jos. G., Thibodeaux, La.
Thienemann, Charles, Baltimore, Md.
Thomas, James, Jr., Nashville, Tenn.
Thomsen, John J., Baltimore, Md.
Thompson, T. C., Galveston, Texas.
Thompson, William B., Philada., Pa.
Thompson, William Partlow, Baltimore, Md.
Thompson, William Scott, Washington, D. C.
Thompson, William Silver, Baltimore, Md.
Tiarks, Hermann, Monticello, Iowa.
Tibbs, William H., Buffalo, N. Y.
Tilden, Henry A., New Lebanon, N. Y.
Tilge, Frederick A., Philadelphia, Pa.
Tilyard, Chas. Slade, Baltimore, Md.
Tompkins, Orlando, Boston, Mass.
Topley, James, Vallejo, Solano County, Cal.
Toplis, Robert J., Yonkers, N. Y.
Torrey, Chas. Edward, Norwich, N. Y.
Tower, Levi, Jr., Boston, Mass.
Townley, William W., Newark, N. J.
Tozzer, Samuel Clarence, Lynn, Mass.
Trask, Charles M., Boston, Mass.
Trimble, Henry, Philadelphia, Pa.
Troth, Samuel F., Philadelphia, Pa.
Tscheppe, Adolph, New York.
Turner, Thos. Larkin, Boston, Mass.
Tufts, Charles Augustus, Dover, N. H.
Tyson, Samuel Ellicott, Washington, D. C.
Ubert, Julius C., Brooklyn, N. Y.
Ude, George, St. Louis, Mo.
Underhill, Charles F., Norfolk, Va.
Underhill, George Francis, Concord, N. H.
Underwood, Chas. G., Boston, Mass.
Vandegrift, John A , Burlington, N. J.
Vandervoord, Ransford Wells, Newark, N. J.
Van Gieson, Theron W., Newark, N. J.

Van Patten, William J., Burlington, Vt.
Van Winkle, Abraham W., Newark, N. J.
Vardick, August H., St. Louis, Mo.
Vaupel, Charles P., Cleveland, O.
Vernor, James, Detroit, Mich.
Viallon, Paul L , Bayou Goula, La.
Vickery, Wm. Henry, Dover, N. H.
Vincent, William, Brooklyn, N. Y.
Vogelbach, Herman Aug., Philada., Pa.
Vogeler, Adolf G., Chicago, Ill.
Voorhees, Wm. H., Plainfield, N. J.
Wagener, Samuel H., Muskegon, Mich.
Wagner, Henry, Cincinnati, O.
Wagner, Louis, Richmond, Va.
Wakefield, Seth D., Lewiston, Me.
Walker, John A., Caledonia, Ontario, Canada.
Wangler, C. D., Cincinnati, O.
Wanier, George S., New York.
Wardell, Robert C., Battle Creek, Mich.
Warner, William R., Philadelphia, Pa.
Warren, George W., Boston, Mass.
Warrington, Charles W., Moorestown, N. J.
Waugh, George J., Stratford, Ontario, Canada.
Wayne, Edward S., Cincinnati, O.
Weaver, J. Thornton, Philada., Pa.
Weaver, James, New York.
Weaver, John A , Easton, Pa.
Webb, John Alanson, Baltimore, Md.
Webb, Henry E., West Farms, N. Y.
Webb, William H., Philadelphia, Pa
Webher, Joseph T., Springfield, Mass.
Weber William, Philadelphia, Pa.
Webster, Stephen, Boston, Mass.
Weeks, Eugene J., Jackson, Mich.
Weidemann, Charles A., Phila., Pa.
Weinman, Oscar C., New York.
Weismann, Augustus W., New York.
Wellcome, Henry Solomon, New York.
Wells, Chas C., Northampton, Mass.
Wells, Jacob David, Cincinnati, O.
Wells, John C., Hartford, Conn.
Wenck, George J., New York.
Wendel, Henry Edward, Phila., Pa.
Wendler, Robert, Brooklyn, N. Y.
Wenzell, William T., San Francisco, Cal.
Westerfield, Joseph H., New York.
Whall, Joseph Stokes, Boston, Mass.
Wharton, John C., Nashville, Tenn.
Wharton, Wm. H., Nashville, Tenn.
Wheeler, C. Gilbert, Chicago, Ill.
Wheeler, Lucian F., New York.
White, Aaron Smith, Mt. Holly, N.J.
White, George H., Jersey City, N. J.
White, Philip A., New York.
Whitfield, Thomas, Chicago, Ill.
Whiting, Frederick T., Great Barrington, Mass.
Whitman, Nelson Samuel, Hudson, Mass.
Whitney, Henry M., Lawrence, Mass.
Wickham, William Hull, New York.
Wiegand, Thomas S., Philada., Pa.
Wienges, Conrad, Jersey City, N. J.
Wigert, Carl R., Burlington, Iowa.
Wike, Albert D., Marietta, Pa.
Wild, Joseph Oscar, Holyoke, Mass.
Wilder, Frederick Wales, Ware, Mass.
Wilder, Graham, Louisville, Ky.
Wilder, Hans M., Philadelphia, Pa.
Wilkins, Daniel Gilbert, Boston, Mass.
Willard, Joseph, Chicago, Ill.
Willard, William Henry, Worcester, Mass.
Williams, John K., Hartford, Conn.
Williams, Joseph, Newton Centre, Mass.
Williamson, E. J , St. Louis, Mo.
Willis, Joseph Norment, Richmond, Va.
Wilson, Adam H., Philadelphia, Pa.
Wilson, Benjamin Osgood, Boston, Mass.
Wilson, Howard E., Springfield, Mass.
Wilson, Julius H., Chicago, Ill.
Wilson, William, New York.
Wingate, Jeremiah Young, North Conway, N. H.

Winkleman, John Henry, Baltimore, Md.
Winslow, Samuel W., Boston, Mass.
Winter, Jonas, Hagerstown, Md.
Witte, L. Edward, St. Louis, Mo.
Woltersdorf, Louis, Chicago, Ill.
Wood. Alonzo Fulton, New Haven, Conn.
Woodbridge, George Washington, Boston, Mass.
Woodruff, R. S., Waterbury, Conn.
Woodward, Samuel Morris, Baltimore, Md.
Worthington, J. Willits, Moorestown, N. J.
Wright, Archibald W., Philada., Pa.
Wright, William P., Boston, Mass.
Wright, William, Jr., Fort Wayne, Ind.
Wynn William, Brooklyn, N. Y.
Yeomans, L. W., Belleville, Ontario, Canada.
Yorston, Mathew Mackay, Cincinnati, O.
Young, Alexander S., Wheeling, W. Va.
Young, John Edward, Vergennes, Vt
Zeilin, John Henry, Macon, Ga.
Zellhoefer, George, New York.
Ziegler, Philip Milton, Reading, Pa.
Zwick, George Gilbert, Covington, Ky.

LIST OF DECEASED MEMBERS.

HONORARY MEMBERS.

		Elected.	Died.
Bache, Franklin, M.D.,	Philadelphia, Pa.,	1857,	1864
Bailey, Montgomery J., M.D.,	New York, N. Y.,	1856,	1873
Boullay, Pierre François Guillaume,	Paris, France,	1868,	1869
Casselmann, Arthur, Ph.D.,	St. Petersburg, Russia,	1868,	1872
Deane, Henry,	London, England,	1868,	1874
Durand, Elias,	Philadelphia, Pa.,	1857,	1873
Farrington, Thomas,	Boston, Mass.,	1856,	1867
Hanbury, Daniel,	London, England,	1868,	1875
Ludwig, Hermann, Ph.D.,	Jena, Germany,	1871,	1873
Robinet, Stephane,	Paris, France,	1868,	1869

ACTIVE MEMBERS.

		Elected.	Died.
Anderson, James H.,	New York, N. Y.,	1859,	1866
Aspinwall, James S.,	New York, N. Y.,	1855,	1874
Bache, Charles L.,	San Francisco, Cal.,	1852,	1854
Backus, James W.,	Marine City, Mich.,	1867,	1870
Balmer, James,	Baltimore, Md.,	1856,	1866
Barry, John W.,	Baltimore, Md.,	1856,	1861
Baylis, William E. P.,	Brooklyn, N. Y.,	1860,	1872
Baynon, John,	Shreveport, La.,	1858,	1862
Benzinger, John Sylvester,	Baltimore, Md.,	1860,	1869
Bigelow, Francis O.,	Medford, Mass.,	1859,	1863
Billings, Samuel J.,	New York, N. Y.,	1860,	1865
Bingham, John C.,	St. Johnsbury, Vt.,	1853,	1870
Blair, Henry C.,	Philadelphia, Pa.,	1855,	1862
Blauw, Hippolyt A.,	Rochester, N. Y.,	1856,	1870
Bowman, Henry K.,	Philadelphia, Pa.,	1869,	1873
Bright, James Evesson,	Worcester, Mass.,	1868,	1872
Bringhurst, Ferris,	Wilmington, Del.,	1862,	1871
Brown, John T.,	Boston, Mass.,	1859,	1860
Brown, William,	Boston, Mass.,	1858,	1875
Canavan, Benjamin,	New York, N. Y.,	1855,	1857
Carney, Charles Tibbetts,	Boston, Mass.,	1853,	1862

		Elected.	Died.
Caspari, Charles,	Baltimore, Md.,	1856,	1870
Chapman, William B (Pres. 1854–55),	Cincinnati, O.,	1852,	1874
Churchill, George W.,	Chelsea, Mass.,	1865,	1869
Clency, William F.,	Cincinnati, O.,	1859,	1865
Coddington, Isaac,	New York, N. Y.,	1855,	1874
Colby, Moses D.,	Boston, Mass.,	1859,	1870
Coon, Walter S.,	New York, N. Y.,	1858,	1861
Coppuck, Peter V.,	Mount Holly, N. J.,	1857,	1869
Cressman, Noah,	Waterloo, Canada West,	1863,	1864
Cunningham, James E.,	Pittsburg, Pa.,	1860,	1863
Cushman, Alexander,	New York, N. Y.,	1858,	1861
Davies, Robert J.,	Brooklyn, N. Y.,	1858,	1872
De Motte, Henry A.,	Jersey City, N. J.,	1871,	1873
D'Evers, Henry Gaston,	Chicago, Ill.,	1865,	1870
Dodge, John P.,	New York, N. Y.,	1855,	1863
Easterbrook, Ray B.,	New York, N. Y.,	1858,	1868
Ellis, Charles (Pres. 1857–58),	Philadelphia, Pa.,	1852,	1873
Emanuel, Louis M., M.D.,	Linwood, Pa.,	1857,	1868
Everson, John C.,	Philadelphia, Pa.,	1863,	1872
Fish, George B.,	Saratoga Springs, N. Y.,	1860,	1866
Fish, Henry F.,	New York, N. Y.,	1852,	1868
Forester, Richard,	Brooklyn, N. Y.,	1860,	1862
Fulton, John Culpepper P.,	Brooklyn, N. Y.,	1873,	1874
Gabaudan, Arthur W.,	New York, N. Y.,	1862,	1870
Gaither, Francis S.,	Washington, D. C.,	1860,	1876
Gay, William,	Cambridgeport, Mass.,	1858,	1862
Geiger, Conrad J.,	Canton, O.,	1866,	1876
Gerhard, John C.,	Cincinnati, O.,	1862,	1866
Geyer, Andrew,	Boston, Mass ,	1853,	1855
Graefle, Frederick Alexander,	Baltimore, Md.,	1870,	1873
Groneweg, Louis,	Cincinnati, O.,	1864,	1866
Harbaugh, Valentine,	Washington, D. C.,	1856,	1871
Hassard, Peter J.,	Philadelphia, Pa.,	1853,	1876
Hegeman, Frederick Augustus,	New York, N. Y.,	1855,	1860
Hegeman, William,	New York, N. Y.,	1858,	1875
Hensch, Hugo,	Cleveland, O.,	1872,	1873
Hendel, Samuel D.,	St. Louis, Mo.,	1858,	1871
Hill, Henry E.,	Detroit, Mich.,	1866,	1868
Hollis, Thomas,	Boston, Mass.,	1853,	1875
Hommann, James W.,	New York, N. Y.,	1875,	1875
Jardella, Jerome B.,	Vincennes, Ind.,	1865,	1870
Jenkins, William Ellis,	Boston, Mass.,	1865,	1869
John, Frederick L.,	Philadelphia, Pa.,	1856,	1864
Johnston, Charles P.,	Memphis, Tenn.,	1868,	1873
Junghanns, Charles A.,	Cincinnati, O.,	1858,	1862
Keffer, Frederick A., M.D.,	New Orleans, La.	1862,	1873
Kennedy, Robert C.,	Cleveland, O.,	1865,	1868

		Elected.	Died.
Kent, Asbury,	Cincinnati, O.,	1854,	1860
Kent, William,	Cincinnati, O.,	1864,	1867
Kidder, Darius B.,	Boston, Mass.,	1858,	1874
King, Alexander,	Buffalo, N. Y.,	1874,	1876
King, Henry,	New York, N. Y.,	1858,	1867
Knapp, Edwin E.,	Norwalk, Conn.,	1860,	1862
Laidley, Joseph,	Richmond, Va.,	1852,	1861
Lancaster, Thomas A.,	Philadelphia, Pa.,	1859,	1875
Lane, James B.,	Fitchburg, Mass.,	1856,	1867
Leitch, Alexander,	St. Louis, Mo.,	1858,	1868
Lineaweaver, Kline Cyrus,	Washington, D. C.,	1864,	1873
Little, William B.,	Panama, U. S. Colombia,	1857,	1867
Longshaw, William, Jr., M.D.,	Bayou Sara, La.,	1858,	1864
Lyon, Charles H., Jr.,	Boston, Mass.,	1858,	1871
McBride, James,	St. Louis, Mo.,	1864,	1871
McConville, Michael S.,	Worcester, Mass.,	1859,	1873
McDonald, John,	Brooklyn, N. Y.,	1860,	1861
McIntyre, Timothy C., M.D.,	Washington, D. C.,	1858,	1862
McPherson, George B.,	Cincinnati, O.,	1867,	1871
Massot, Eugene L.,	St. Louis, Mo.,	1857,	1871
Matt, Joseph,	Columbus, O.,	1872,	1874
Mattern, Jonathan C.,	Pittsburg, Pa.,	1860,	1876
Maxwell, James T.,	New York, N. Y.,	1855,	1860
Mayer, Ferdinand F.,	New York, N. Y.,	1859,	1869
Meakim, John (Pres. 1855–56),	New York, N. Y.,	1852,	1863
Metcalf, Tristram W.,	Brooklyn, N. Y.,	1857,	1873
Melzar, Augustus P.,	Wakefield, Mass.,	1856,	1874
Milhau, John (Pres. 1867–68),	New York, N. Y.,	1855,	1874
Muller, William H.,	Chicago, Ill.,	1865,	1870
Nagle, John G.,	Baltimore, Md.,	1863,	1869
Nairn, Joseph Wilson,	Washington, D. C.,	1858,	1875
Nadand, James W.,	Cincinnati, O.,	1864,	1868
Norgrave, Samuel K.,	Pittsburg, Pa.,	1857,	1871
Olliffe, William J., M.D.,	New York, N. Y.,	1858,	1866
O'Brien, Joseph C.,	Baltimore, Md.,	1863,	1873
Osgood, Samuel W.,	Davenport, Iowa,	1858,	1860
Palmer, Albert G.,	Washington, D. C.,	1858,	1860
Parker, Herschel,	Brooklyn, N. Y.,	1867,	1870
Parrish, Edward (Pres. 1868–69),	Philadelphia, Pa.,	1852,	1872
Peck, Samuel P.,	Bennington, Vt.,	1853,	1859
Pettis, Newton C.,	North Adams, Mass.,	1868,	1874
Philbrick, Samuel R., M.D.,	Boston, Mass.,	1852,	1859
Phillips, Llewellyn,	Baltimore, Md.,	1856,	1865
Platzer, Robert,	Philadelphia, Pa.,	1865,	1874
Polhemus, James L.,	Sacramento, Cal.,	1866,	1867
Pollard, Charles P.,	Marysville, Cal.,	1859,	1869
Procter, William, Jr. (Pres. 1862–63),	Philadelphia, Pa.,	1852,	1874

		Elected.	Died.
Pyle, J. Lindley,	Brooklyn, N. Y.	1859,	1866
Rehfuss, Lewis,	Cincinnati, O.,	1854,	1856
Reifsnider, William E.,	Baltimore, Md.,	1864,	1872
Reinold, Bernard H.,	New York, N. Y.,	1861,	1876
Roberts, David,	Boston, Mass.,	1858,	1863
Rollmann, Frederick,	Philadelphia, Pa.,	1862,	1864
Roemer, Daniel,	Cincinnati, O.,	1865,	1870
Sands, Jesse M.,	New York, N. Y.,	1860,	1867
Schmidt, Henry,	New York, N. Y.,	1874,	1875
Scott, John,	Cincinnati, O.,	1854,	1873
Scully, Harmar D.,	Pittsburg, Pa.,	1858,	1866
Smith, Charles Augustus,	Cincinnati, O.,	1852,	1862
Smith, Edward A.,	Baltimore, Md.,	1870,	1875
Smith, Edwin R.,	Monmouth, Ill.,	1862,	1869
Smith, James W.,	Norfolk, Va.,	1873,	1876
Smith, Samuel A.,	Newburyport, Mass.,	1859,	1874
Squire, William H.,	Germantown, Pa.,	1862,	1865
Steiner, Henry,	Philadelphia, Pa.,	1857,	1858
Stevens, Ashbel Mead,	Cincinnati, O.,	1854,	1860
Stevens, Rufus Walker,	Somersworth, N. H.,	1859,	1868
Suding, Henry A.,	Baltimore, Md.,	1870,	1875
Sweetser, Thomas Augustus,	South Danvers, Mass.,	1859,	1860
Taylor, Robert J.,	Newport, R. I.,	1859,	1871
Taylor, William,	Philadelphia, Pa.,	1868,	1871
Thomas, William,	Jersey City, N. J.,	1855,	1856
Tully, Andrew J.,	New York, N. Y.,	1862,	1875
Uhl, Charles,	Memphis, Tenn.,	1860,	1873
Waite, Samuel B.,	Washington, D. C.,	1858,	1862
Warren, Charles Henry,	Brandon, Vt.,	1872,	1876
Warren, William,	Brighton, Mass.,	1867,	1871
Watson, William J.,	Brooklyn, N. Y.,	1853,	1872
Weyman, George W., Ph.D.,	Pittsburg, Pa.,	1858,	1864
White, Daniel F.,	Charlestown, Mass.,	1859,	1864
White, William P.,	Chicago, Ill.,	1865,	1866
Whitehead, Silas,	Lynchburg, Va.,	1856,	1858
Wilson, George C.,	Boston, Mass.,	1859,	1861
Wiseman, Charles,	Baltimore, Md.,	1856,	1862
Witzell, Louis,	Cincinnati, O.,	1864,	1867
Wood, G. Davidge,	Baltimore, Md.,	1856,	1863
Woods, Samuel H.,	Boston, Mass.,	1859,	1869
Wright, George,	New York, N. Y.,	1869,	1873

LIST OF RESIGNATIONS.

Names.	Residence.	Elected.
Framptin, Lingard A.,†	Charleston, S. C.,	1874
Lillard, Benjamin,§	Boston, Mass.,	1869
Raser, William H.,‡	Philadelphia, Pa.,	1869
Steer, Justin,§	Chicago, Ill.,	1869
Wiley, Abram S.,†	Boston, Mass.,	1857

LIST OF MEMBERS DROPPED FROM THE ROLL.

Names.	Residence.	Elected.
Allen, Alexander B.,	South Charlestown, Ohio,	1869
Archibald, Henry C.,	Philadelphia, Pa.,	1867
Beidelman, John W.,	Little Rock, Ark.,	1871
Bock, August W.,	Cleveland, Ohio,	1872
Breunert, Augustus,	Kansas City, Mo.,	1868
Burrough, Horace,	Baltimore, Md.,	1869
Calvert, John,	San Francisco, Cal.,	1870
Carman, George E.,	Jersey City, N. J.,	1872
Cubbison, James M.,	Newcastle, Pa.,	1873
Dannattel, George F.,	Baltimore, Md.,	1867
Davidson, Frank A.,	Boston, Mass.,	1873
Falke, William,	New York, N. Y.,	1874
French, Paul F.,	Kansas City, Mo.,	1871
Goecke, Augustus G.,	New York, N. Y.,	1867
Hollister, Arthur F.,	St. Louis, Mo.,	1871
Jones, Samuel T.,	Philadelphia, Pa.,	1867
Kirby, Thomas E.,	Baltimore, Md.,	1863
Kovacs, Martin,	St. Louis, Mo.,	1871
Lohman, George H.,	Kendallville, Ind.,	1872
Lyon, George P.,	Kansas City, Mo.,	1871
Mann, Albert H.,	Kansas City, Mo.,	1869
Marion, Alfred N.,	Baltimore, Md.,	1872
McVoy, James L.,	Mobile, Ala.,	1871
Naulty, William H.,	Little Rock, Ark.,	1870
Pope, John H.,	New Orleans, La.,	1860
Primo, Manuel,	Mobile, Ala.,	1868
Rockafellow, Charles N.,	Hot Springs, Ark.,	1873
Rothrock, Weller,	Baltimore, Md.,	1869
Sheets, James A.,	Baltimore, Md.,	1870
Stein, Gottlieb,	New York, N. Y.,	1871
Whipple, N. Dana,	New York, N. Y.,	1871
Wilkins, John D.,	Selma, Ala.,	1871

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† Left the business. § No reason given.

‡ Inability to attend the meetings.

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